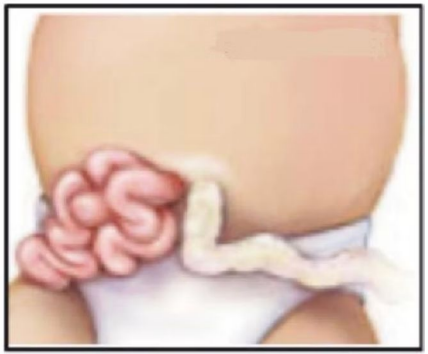
Dr. Wafaa Review Group MCQs

Gastroschisis vs Omphalocele

Gastroschisis is a ventral wall defect that results in paraumbilical herniation of the intestine through the abdominal wall without formation of a hernia sac.

Protrusion of intestinal content usually on the right side of the umbilicus . The intestine is not contained in a hernia sac and appears edematous, erythematous, and dull.

Shortened bowel,Malabsorption caused by mucosal damage ,Peritonitis Seen especially in premature infants and associated with cryptorchidism and gastrointestinal stenoses or atresia.



Gastroschisis vs Omphalocele

Omphalocele is a ventral wall defect that results in congenital herniation of abdominal viscera through the abdominal wall at the umbilicus.

The hernia sac is covered by the amniotic membrane and the peritoneum.

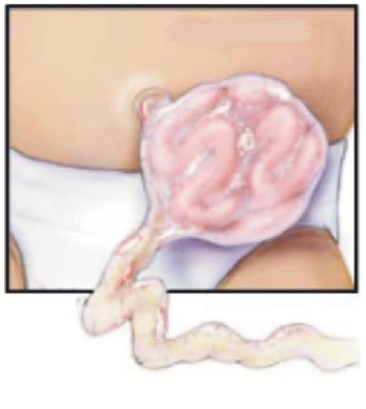
Frequently observed in trisomies (trisomy 21, trisomy 18, and trisomy 13) and Beckwith-Wiedemann syndrome

Often associated with additional malformations (e.g., cardiac, gastrointestinal, genitourinary, and neural tube defects)

Most commonly affects premature infants

Umbilical hernia sac (may contain intestine, liver, and gall bladder)

Features of associated conditions



1) Regarding X-linked dominant inheritance, the following are correct EXCEPT:

a)Both males and females are affected
b)No skip of generation
c)All daughters of an affected father will be affected
d)None of sons of an affected father will be affected
e)In each pregnancy there is a 25% chance of having an affected offspring

ANSWER: e) it is 50%

The X linked disorders are like the AR, and AD diseases. The X-linked recessive will have 25% risk and the AD will have 50 % risk

2) The following are true about Down syndrome
EXCEPT:
a)It’s the most common type of trisomies
b)The phenotype in translocation Down syndrome is usually milder than the non-disjunction trisomy 21
c)Low maternal serum alpha Fetoprotein, low estriol, and high human chorionic gonadotropin, HCG are indicators of Down syndrome
d)The incidence of trisomy 21, 13 and 18 increases with increase maternal age
e)95% of Down syndrome individuals have 3 copies of chromosome 21, 1% are mosaic, and 4% have translocation.

Answer: b)
clinically, We cannot differentiate between the translocation and nondisjunction types of DS. Therefore, karyotyping is mandatory for G. counseling

3) In Prader-Willi syndrome (PWS): Choose the INCORRECT answer:

a)Less than10% of these patients have de novo microdeletions of chromosome 15

b)The deletion always occurs on the paternally derived chromosome

c)Deletion of the maternal chromosome 15 will give rise to Angelman Syndrome

d)PWS genes are normally silenced on the maternal chromosome 15

e)Uniparental disomy can be a cause for PWS.

•ANSWER: a)

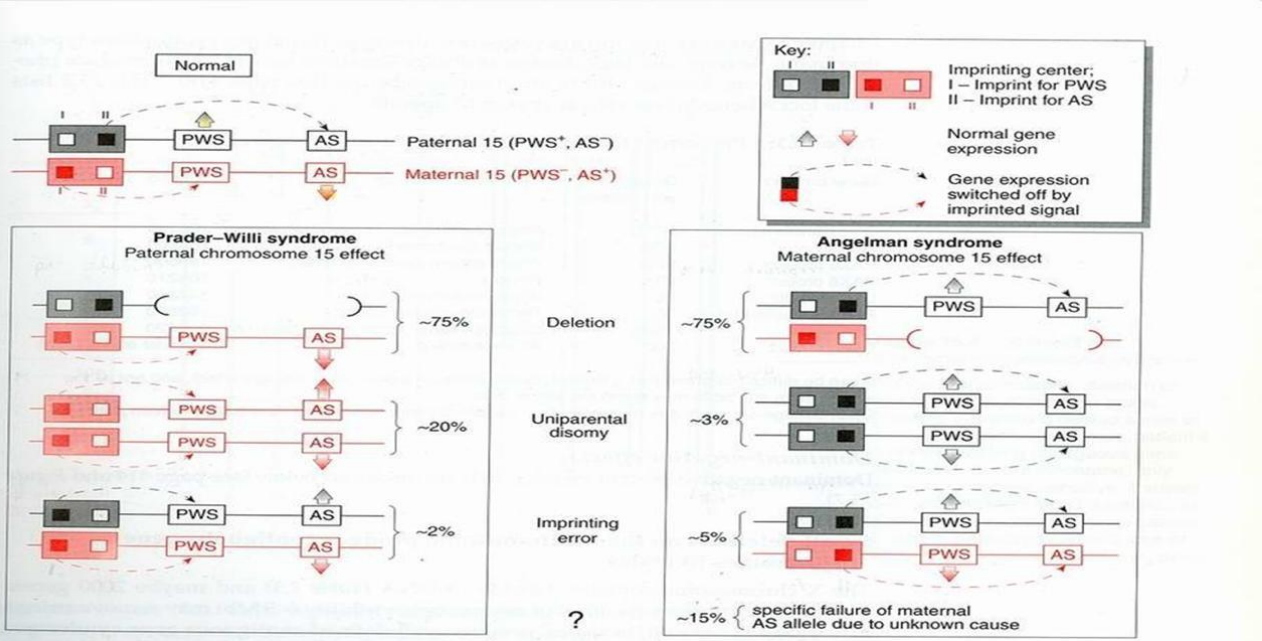


Figure 15.3: Pathogenic mechanisms in Prader–Willi (PWS) and Angelman (AS) syndromes.

PWS and AS are caused by lack of expression of their respective genes. These lie close together on chromosome 15. Deletions (usually encompassing both genes) are the commonest cause of either syndrome (top lines in boxes). However, only deletion or nonexpression of the paternal copy of PWS (black) or the maternal copy of AS (red) has any effect, because the other alleles are normally silenced by an imprinting center located some distance away (dashed arrows). If one homolog is missing becuase of uniparental disomy (middle lines in boxes), the effect is the same as deletion. Rarely, an imprinting error mimics the effect of uniparental disomy (bottom lines in boxes). Some cases of AS appear to result from specific nonexpression of the maternal AS gene, without the methylation pattern associated with a paternal imprint. See Lalande (1994) for further details.

4) Who is of the following most likely has normal mentality?

a)Turner syndrome (45, X).

b)Klinefelter (47, XXY).

c) 5p deletion syndrome (cri du chat syndrome).

d) 47, XYY syndrome.

e) 45, XX (15q 21 q) translocation.

Answer: e)
Explanation:
a)Turner syndrome (45, X): has about a 60% association with intellectual disability
b) Klinefelter (47, XXY): Some degree of language learning or reading impairment may be present
C) 5p deletion syndrome (cri du chat syndrome): has the most severe MR
d) XYY aggressive behavior
e) normal female has a risk of having baby with Down syndrome.
#Translocation Down syndrome has 46 XY or XX.
The parent will have 45 chromosomes
47 XY+21 called
Non disjunction

You do request parents' chromosomes
Actually
It is a must to do parental chromosomes
study
in case of 46 Down syndrome
 For every pregnancy
the mom will under go a prenatal testing
in order to avoid the recurrent risk

5) A 12 -year old boy develops a disorder that also presents in his father. No one else in the family is known to be affected. Which of the following modes of inheritance that is unlikely?

a)chromosomal.

b)Autosomal dominant.

c)X-linked recessive.

d)Multifactorial.

e)Y-linked.

Answer: c)
X-linked recessive or dominant disorders can’t be inherited from father to son as he normally passes his Y chromosome to his sons.

6) The following genetic disorders match their cytogenetic karyotype EXCEPT:

a)Male with trisomy 21 (Down syndrome) has 47, XX, +21karyotype

b)Female with Turner syndrome has 45, X karyotype

c)Female with monosomy 21 has 45, XX, -21

d)Female with Down syndrome mosaicism 47, XX, + 21 / 46, XX karyotype

e)Male with Klinefelter syndrome has a 47, XXY karyotype

Answer: a)

Male with trisomy 21 (Down syndrome) has 47, XX, +21karyotype

7) In Turner's syndrome: The incorrect answer is
a)No risk for having cataract
b)The cells contain 45 chromosomes
c)The offspring have 50% of inheriting the disease
d)There is an increased risk of hypertension
e)The patient is below the average height

Answer: c)

•Women with Turner syndrome are almost universally infertile.

•Turner syndrome is often associated with persistent hypertension, sometimes in childhood.

* In the majority of Turner syndrome patients with hypertension, no specific cause is known.

* In the remainder, it is usually associated with cardiovascular or kidney abnormalities.

The incidence is higher in individuals with 45X karyotypes compared with X mosaicism or other X structural abnormalities.

Left-sided obstructive lesions are most common, with a prevalence of 30% for BAV (bicuspid aortic valve) and 18% for aortic coarctation

8) Khalid is a 12-yr. old who is referred to your clinic because of scoliosis, and shortness of breath. History revealed that parents are first cousins. He is at 6th grade in school with good performance. On examination, you find that he is tall for age and underweight. He wears glasses. The most likely diagnosis is:

a)Fragile X syndrome

b)Klinefelter syndrome

c)Homocystinuria

d)Marfan syndrome

e)Mosaic trisomoy-8 AND XYY syndrome

Answer: d) Marfan syndrome is the only one who has normal mentality.
All of them have in common a tall stature, beside XXY syndrome

And
Marfan syndrome can present with shortness of breath due to several reasons:

1. *Aortic Root Dilatation:* People with Marfan syndrome often have aortic root dilatation, which can lead to aortic valve regurgitation. This can cause the heart to work harder to pump blood, leading to shortness of breath.

2. *Pneumothorax:* Individuals with Marfan syndrome are at an increased risk of spontaneous pneumothorax

3. *Restrictive Lung Disease:* The skeletal abnormalities associated with Marfan syndrome, such as scoliosis and pectus excavatum, can affect lung function and lead to restrictive lung disease, which can cause shortness of breath.

🔴Marfan syndrom: normal mentality

🔴HCU: mental retardation

Lenses go up ⬆️
IQ goes up⬆️

Leses go down⬇️
IQ goes down ⬇️

Marfan syndrome *VS* homocystinuria

Marfan Syndrome	Classical Homocystinuria
Autosomal **DOMINANT**, FBN1 mutation on chromosome 15	Autosomal **RECESSIVE**, CBS mutation on chromosome 21
HYPEREXTENSIBLE joints, **UPWARD** dislocation of ocular lense	**RIGID** joints, **DOWNWARD** dislocation of ocular lense
Aortic root **DILATION/DISSECTION**, valvular insufficiency	**VASO-OCCLUSIVE** disease
Diagnosis is made with the revised **GHENT** criteria	Diagnosis is made with high plasma/urine levels of **HOMOCYSTEINE** and **METHIONINE**
Aortic aneurysm is treated with **β-BLOCKERS ± SURGERY**	Primarily treated with high dose vitamin B_6

9) A dominantly inherited trait affects a child and his grandmother, but neither parent. This best illustrates which of the following principles?

a)Variable expressivity.

b)New mutation.

c)Somatic mosaicism.

d)Non-penetrance.

e)An incorrect diagnosis.

Answer: d) Non-penetrance. The penetrance of a disease-causing mutation is the proportion of individuals with the mutation who exhibit clinical symptoms. For example, if a mutation in the gene responsible for a particular autosomal dominant disorder has 95% penetrance, then 95% of those with the mutation will develop the disease, while 5% will not.

Features of AD conditions include:

- Variable expressivity.
- New mutation.

For question No 9
Plz read it from
Medstudy book

10) Females occasionally have symptoms of X-linked recessive disease such as Duchene muscular dystrophy. The most common explanation is:
a)Non-random X-inactivation (lyonization).
b)a female who has 2 parents with the defect on their X chromosomes
c)X-autosome balanced translocation that disrupts the X-chromosome locus
d)Turner syndrome (45, X)
e)46, XY female karyotype

Answer: a)Non-random X-inactivation (lyonization).
The other options are options are possible, yet they are not as common as the non-random X-inactivation (lyonization) which is a naturally occurring phenomenon that keep a balance in the gene dosage between males and females

11) Two carriers of albinism have four children. One of their children is albino and the remaining three are normally pigmented. What is the probability that their next child will be albino?

a) 0 %
b)25%
c)50%
d)75%
e)100%

Answer: b)
25%. As long as the parents are carriers, the risk remains 25% regardless of the No. of normal kids they have.

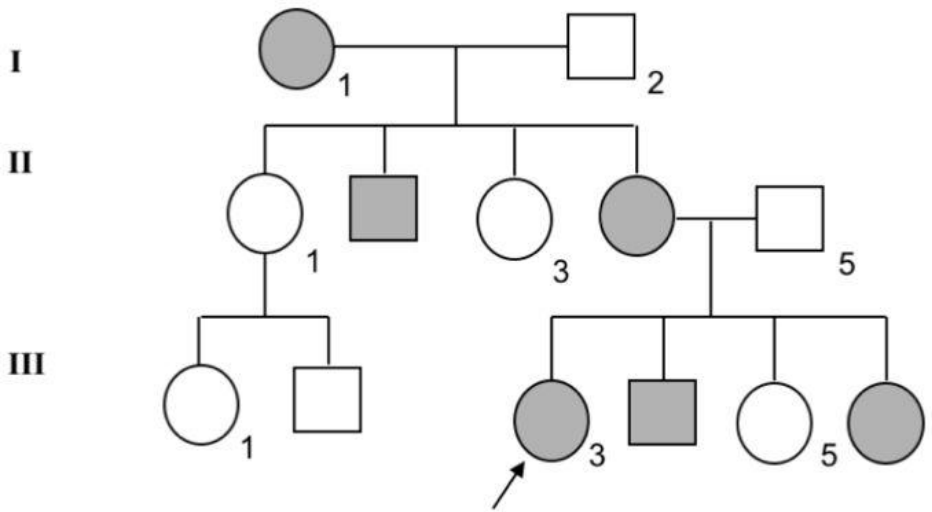
12) Clinical indications for karyotyping (chromosome study) include all the following EXCEPT:
a)Multiple malformation in a newborn
b)A minor malformation in a newborn
c)Mental retardation of unknown etiology
d)Offspring with a chromosome rearrangement
e)Recurrent pregnancy losses

Answer: b) minor malformation in a newborn

(Questions 13-14)

The above pedigree is an example of:

a)Biotinidase deficiency
b)Neurofibromatosis
c)Color-blindness
d)Sickle cell anemia
e)Ataxia telangiectasia



Answer:b)Neurofibromatosis

a)Biotinides deficiency

d)Sickle cell anemia, and
e)Ataxia telangiectasia all are AR.

c)Color-blindness is an XLR

14) The risk for III-3 to have an affected child is:
a)25%
b)50%
c)75%
d)100%
e)Virtually 0

ANSWR: 50%

15) The pedigree below is best explained by which of the following inheritance patterns:

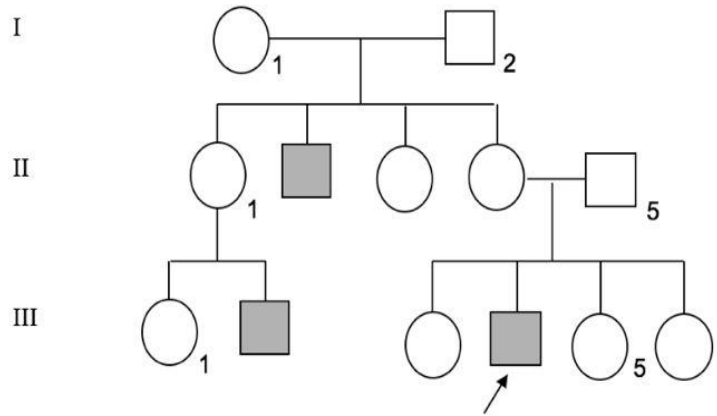
a)Autosomal dominant inheritance

b)Autosomal recessive inheritance

c)X-linked recessive inheritance

d)Autosomal dominant or autosomal recessive inheritance

e)Mitochondrial inheritance



Answer:c
X-linked inheritance.
The daughters of an affected male will be carriers, and none of his boys will be affected.

16)The pedigree below is best explained by which of the following inheritance patterns:

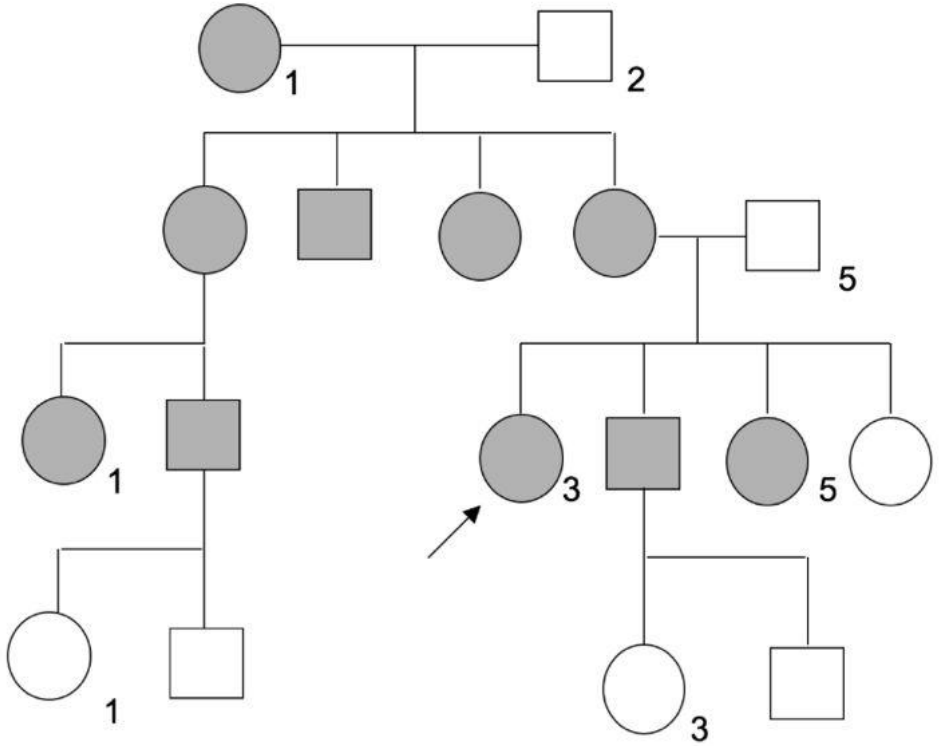
a)Autosomal dominant inheritance

b)Autosomal recessive inheritance

c)X-linked recessive inheritance

d)Autosomal dominant or autosomal recessive inheritance

e)Mitochondrial inheritance



Answer: e
Mitochondrial diseases can affect males, but they will not pass them on to their offspring because the mitochondria in sperm are located in the tail and do not enter the egg during fertilization.

17) The pedigree below is best explained by which of the following inheritance:

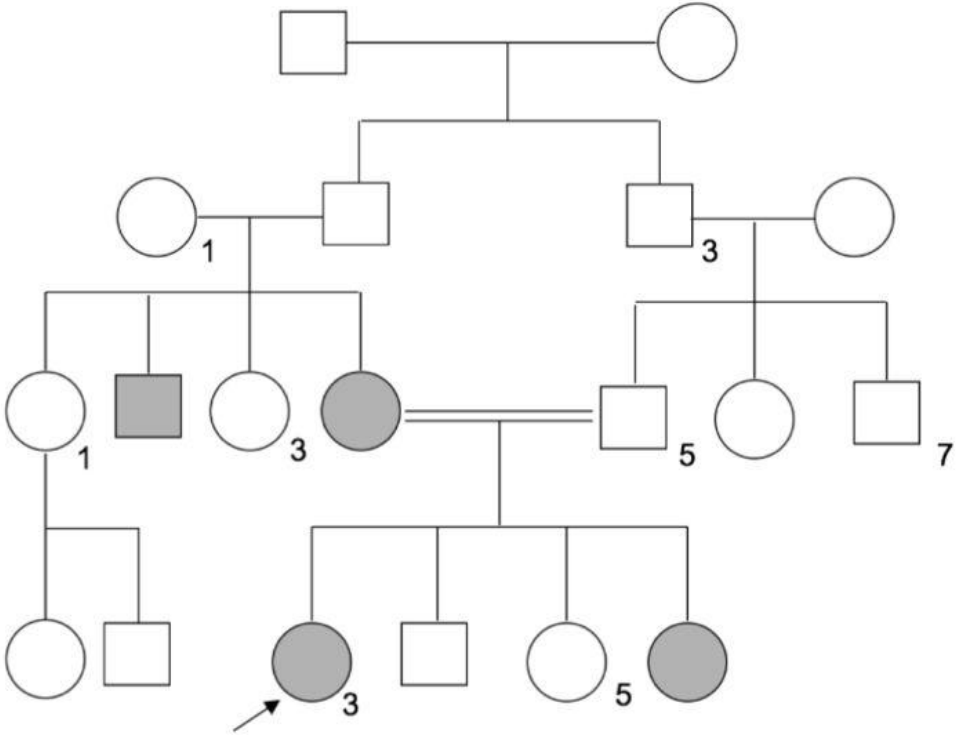
a)Autosomal dominant

b)Autosomal recessive

c)X-linked recessive

d)Mitochondrial inheritance

e)Chromosomal disorder



Answer: b) Autosomal recessive. AR condition is characterized by presence of consanguinity, males and females are affected, and it skips generations

18) The brother of a boy with severe Gaucher disease seeks advice regarding marrying a second cousin. How would you advise him regarding their risk of having affected offspring together?

a)Tell him they can have prenatal diagnosis for the condition.

b)Tell him her risk of being a carrier is low since she has no affected sibs.

c)Advise them to have carrier testing to assess their risks.

d)Advise them not to marry each other.

e)Tell him the condition is now treatable with enzyme replacement

Answer: c) Advise them to have carrier testing to assess their risks

19) All of the following are absolute indications to refer a prenatal patient to genetics EXCEPT:
a)Either parent is a carrier of a balanced chromosomal rearrangement
b)Parental consanguinity
c)Multiple miscarriages due to antiphospholipid antibodies
d)A third cousin with cystic fibrosis.
e)A fifth cousin with sickle cell anemia

Answer: c) Multiple miscarriages due to antiphospholipid antibodies

20) A young woman is pregnant. She and her husband have been diagnosed as healthy carriers of an abnormal hemoglobin gene. The husband is a carrier of a sickle cell gene, the woman carrier of a Beta-thalassemia gene. Would you

a)Recommend to perform a prenatal diagnosis because there is a 25% chance that the child will be affected with a severe anemia.

b)Take no action, because the two mutations would compensate each other.

c)Test the mother regularly during pregnancy for the development of anemia.

d)Prepare the parents that there is a 50% chance that they will have baby with a severe disease.

e)Tell them that as long as they are healthy the fetus will also be healthy

Answer: a

a)I recommend performing a prenatal diagnosis because there is a 25% chance that the child will be affected with severe anemia due to sickle cell-thalassemia disease. We call this condition combined heterozygous and it usually occurs in non-consanguineous couples, whereas homozygous mutations are usually associated with consanguinity.

21) A man with Klinefelter syndrome will have all of the following EXCEPT:

a)A karyotype of 47, XXY

b)An increased incidence of lens subluxation

c)Infertility, and small testicles

d)An increased incidence of breast cancer

e)The most common type of chromosomal abnormalities in male 1:500

ANSWER: b) An increased incidence of lens subluxation

22) A couple is planning to have a child and request to speak with a genetic counselor. The woman explains that she had a sister who died in childhood with Down syndrome. There is no other family history of the condition. What is the most appropriate counseling?

a)Down syndrome is generally sporadic, so there is no increased risk to this couple.

b)If result of her sister's karyotype cannot be found, the woman herself should have chromosomal analysis.

c)The pregnancy will be screened in the second trimester using α-fetoprotein, β-HCG, and conjugated estriol, which should suffice to detect Down syndrome if it has occurred.

d)Prenatal diagnosis should be obtained by chorionic villous sampling or amniocentesis.

e)Prenatal ultrasound should suffice.

ANSWER: b) If result of her sister’s karyotype cannot be found, the woman herself should have a chromosomal analysis. That should R/O the possibility of translocation causes of DS

23) Regarding Spinal Dystraphism. Choose the INCORRECT answer:

a)It’s part of neural tube defect, NTD spectrum

b)Cutaneous markers may be associated with tethered cord

c)Has a less recurrent risk than meningomyelocele

d)Spina bifida occulta is the benign form

e)Folic acid supplementation led to a decline in the incidence of NTD

ANSWER: c) Has a less recurrent risk than meningomyelocele

24) lUniparental disomy for chromosome 15 in which both chromosomes are maternally derived is associated with which of the following syndromes?

a)Rett syndrome.

b)Angelman syndrome.

c)Prader-Willi syndrome.

d)Beckwith-Weidman syndrome.

e)Marfan
syndrome.

ANSWER: c) Prader-Willi syndrome.

The mother and sister of the child might be carriers for a balanced translocation DS
Where their chromosomes No is 45XX. While the child with DS has 46 chromosomes.
NTD has multi factorial inheritance patterns. It’s a spectrum from spins bifida occulta to meningomyelocele The number of affected children will affect the recurrent risk .
Both parents should have spinal X ray looking for spinal bifida occulta

25) Which of the following cell types is NOT used to examine chromosomes or extract DNA?

a) White blood cells.
b) Bone marrow cells.
c) Red blood cells.
d) Hepatocytes.
e) Lymphocytes.

Answer: c) Red blood cells do not have a nucleus which typically contains the chromosomes.

26) Achondroplasia is a dominant form of dwarfism. Two affected couples have a __ % chance of having an “unaffected “child.

a)0
b)25
c)50
d)75
e)100

Answer: b) 25

When there are two carriers, the chance of having a normal child is 25%. Couples who have achondroplasia also have a 25% chance of having a child with a lethal condition who inherits the two dominant genes that lead to fetal or neonatal death. Additionally, there is a 50% chance of having an affected child (since the carriers themselves are affected). Therefore, the overall risk of having an affected child is 75%.

27) A child is born with a cleft lip and palate. This birth defect may be associated with the following:

a) A healthy, otherwise completely normal, newborn infant.
b) A disruption defect related to amniotic bands.
c) A chromosome disorder such as trisomy 13.
d) All of the above.
e) Only A and C above.

ANSWER: d) All the above
Amniotic bands can cause clefting/ cutting any part of the body.
Carrier (heterozygous) of autosomal dominant conditions will show the disease . Homozygous autosomal dominant condition is usually very severe .
E.g
When the parents are heterozygous for Hypercholesterolemia which a dominant condition ,the homozygous child will have xanthomas, Arcus senilis by the age of 5 years, and myocardial infarction by the age of 10 years. The treatment is plasmapheresis, followed by a liver transplant.

28)Ahmad is a 2/12 old baby who has an isolated cleft lip and palate. The parents are worried about the risk of having another affected child. Before you answer them, you should:

a)Obtain hearing text

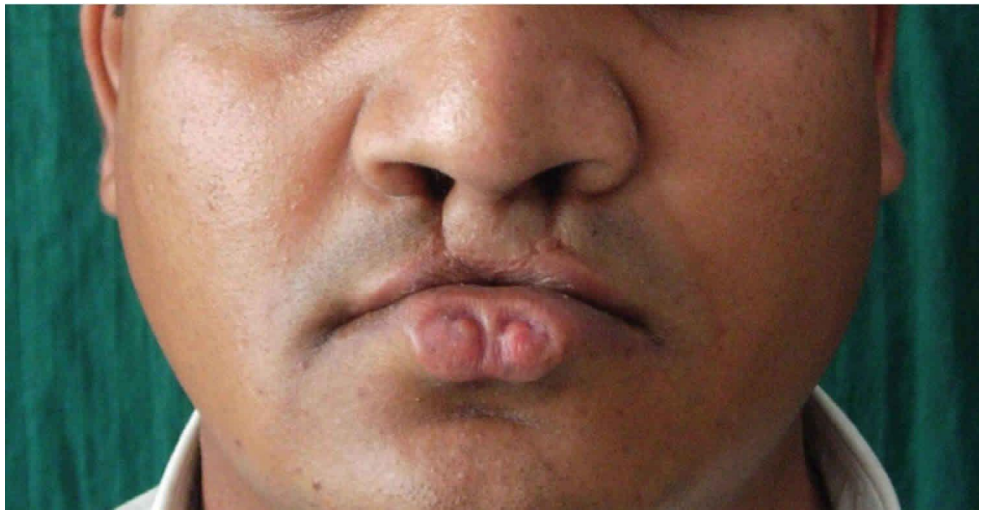
b)Examine the child for other defects

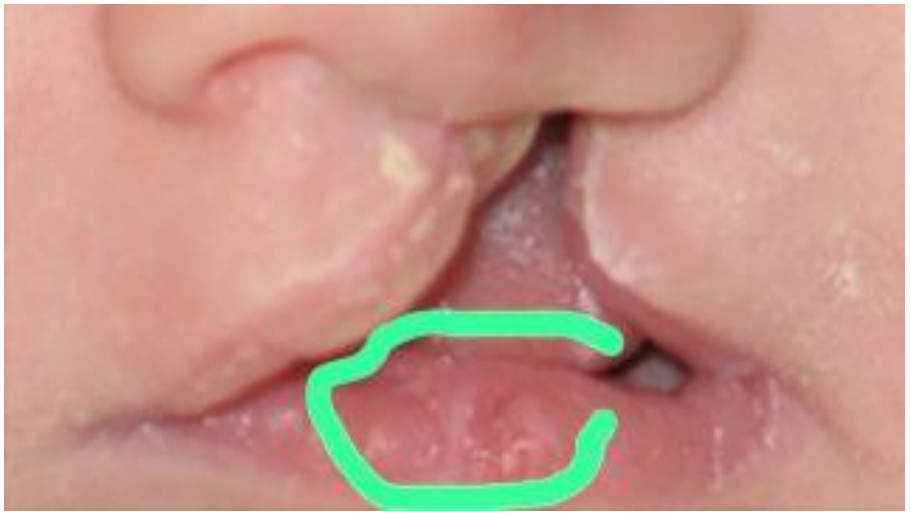
c)Examine the child and parents

d)Examine the other sibs

e)Request chromosomes study.

Answer: C)
Examine the child and parents for the presence of pits on their lip inside on the mucus membrane or outside. That will increase the risk of recurrence from 6% for multifactorial inheritance to 50% of autosomal dominant (Van der Woude syndrome).





29) The following diseases are caused by defect in the mitochondrial DNA EXCEPT:

a)MELAS syndrome.

b)Kearn-Sayer syndrome.

c)Aminoglycoside otoneurotoxicity.

d)Deafness.

e)Huntington disease.

ANSWER: e) Huntington disease
(due to trinucleotide repeats expansion mutation).
The susceptibility for aminoglycoside otoneurotoxicity is mitochondrially inherited .i.e children who have the complication from aminoglycoside will be genetically predisposed to it.

Can you name other disorders that have
Trinucleotide repeat expansion ?
CGG, CAG ….
lip pits associated with Van der Woude syndrome

30) A 14yrs. old boy in 6th grade is doing poorly in all subjects. Physical examination reveals tall stature, bilateral non-nodular enlargement of testes but normal pubertal development. The boy is mentally retarded. The definitive diagnostic study includes:

a)Hormonal studies (e.g., testosterone level).

b)Ultrasonographic studies of testes.

c)MRI of testes.

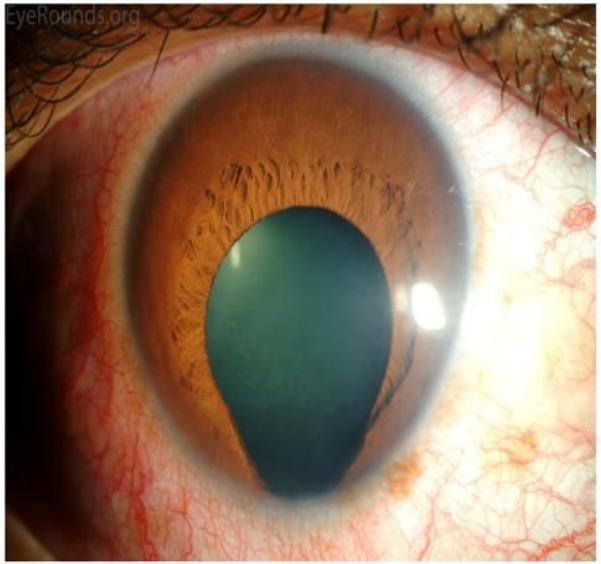
d)CT-scan of testes.

e)DNA mutation analysis

ANSWER: e) DNA mutation analysis

A mentally retarded boy with tall stature , and large testes is having frailer X syndrome.
The mutation is
tri nucleotide repeats expansion.
Perfect.
They are Usually neurological diseases.
All have dominant inheritance EXCEPT!?

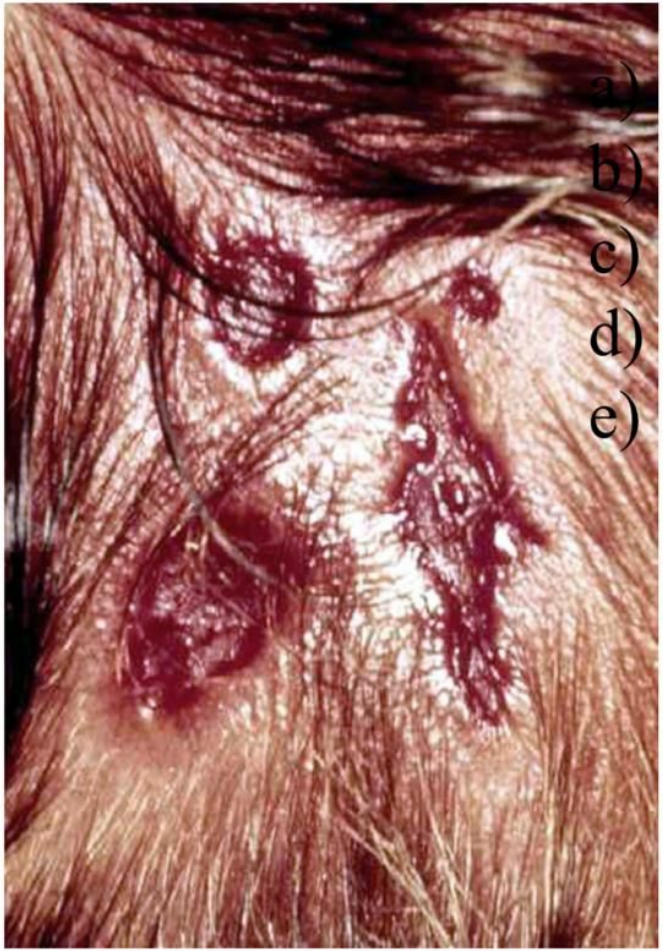
Now they are offering a rapid point-of-care test to check newborns for mitochondrial mutations that predispose them to have deafness as a side effect of aminoglycosides.



ANSWER: b)
CHARGE syndrome
1) Coloboma
2) Heart defects,
3) Atresia choanae (also known as choanal atresia),
4) Growth retardation, Genital abnormalities,
5) Ear abnormalities

NSWER: C
Answer: c)

Other causes include
Adams-Oliver syndrome

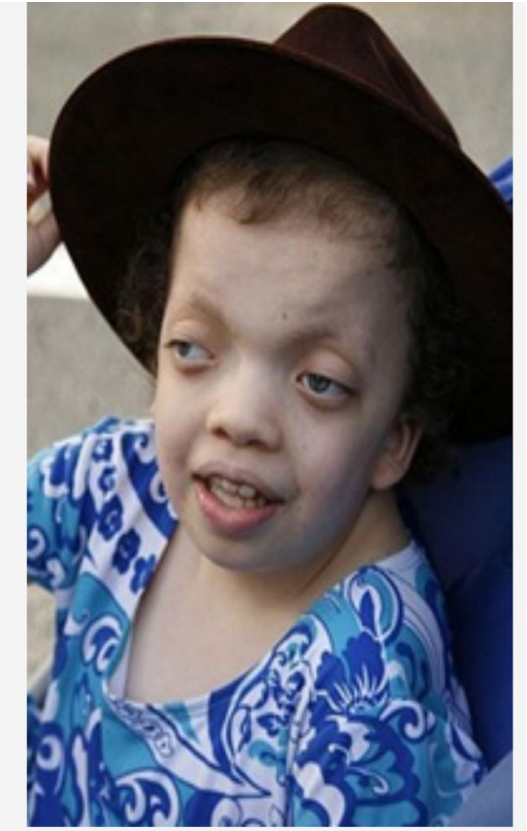


A baby was just born and has these skin lesions, what is the most likely diagnosis, knowing that antenatal history was unremarkable A- Staphylococcal scalded skin syndrome SSSS. B- Toxic epidermal necrolysis. C- Toxic shock syndrome. D- Epidermolysis bullosa.

ANSWER: D
Other causes are possible, however the question stem states that the baby was just born

A male adolescent is diagnosed with primary hypogonadism. Physical examination reveals short stature, antimongoloid slant, hypertelorism, small chin, ptosis, webbed neck, and undescended testes, grade 2/6 systolic murmur over the left upper sternal border, and mental retardation. All of the following statements are true about this syndrome except:

a)Autosomal dominant
b)90% mentally retarded
c)Pulmonic stenosis
d)Associated with neurofibromatosis
e)Human growth hormone improves growth velocity.



ANSWER: b)
Noonan syndrome 25% of cases are mentally retarded.
Recent studies suggest that the presence of PTPN11 mutations in patients with NS indicates a reduced growth response to short-term hrGH treatment

A 3 yrs old Saudi boy brought to your clinic by his mother.
He had a history of failure to thrive in infancy.
On examination you found that he has fair skin,
his weight is on 95%.
His height below 5%.
He has epicanthal fold, flat nasal bridge, upturned nose and small hands

The most likely diagnosis is :
a-Cohen syndrome
b-Bardet-Biedl syndrome (BBS)
c-Alstrom Syndrome
d-Beckwith- Wiedmann syndrome
e- Prader Willi syndrome

Answer : e) Prader Willi syndrome .
plz note that all these syndromes present with obesity or overgrowth.

The most important organ to be checked in this child is:

a)Skeleton
b)Skin
c) heart
d) eyes
e) thyroid

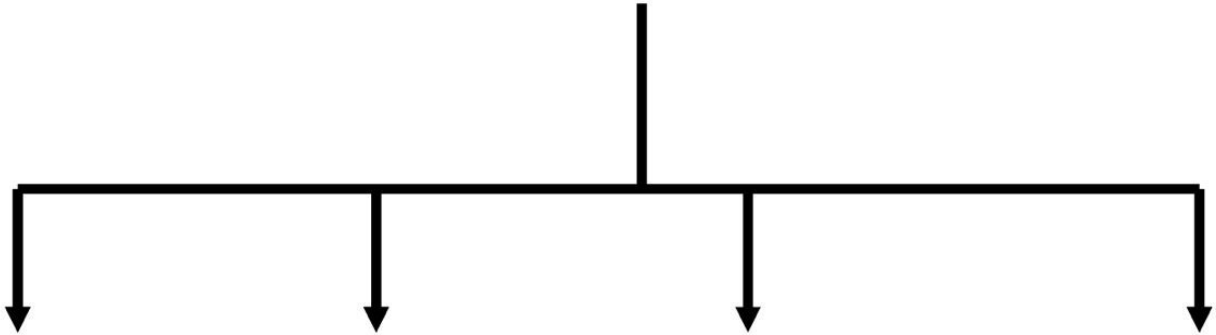
Answer : c) he has William syndrome .
Check for Supravalvular aortic stenosis.
They have Stellate pattern of iris.
Also look for

. hypercalcrmia
. Diabetes mellitus
- Early-onset puberty (menarche about 2 years early)
- Hypothyroidism, subclinical
A very common syndrome in the exam. I obtained some photos from the internet.

Dear members,

In shaa Allah, over the next few days, I will be posting some texts that will help you understand the classification of genetic and metabolic disorders. Understanding their classification can assist in piecing together the puzzle in any field.

Human Genetics



Clinical genetics
Dysmorphology
Study of IEM
Genetic counseling

Cytogenetics

biochemical genetics
(Metabolism)

molecular genetics
(diagnosis/research)

Typical:

- Major types of genetic diseases:

  I) **Chromosomal** 0.19%

  II) **Single gene (monogenic or Mendelian disorders)**

  - Autosomal recessive, AR 0.17% (most common)
  - Autosomal dominant, AD 0.14%
  - X-linked, XL 0.05%

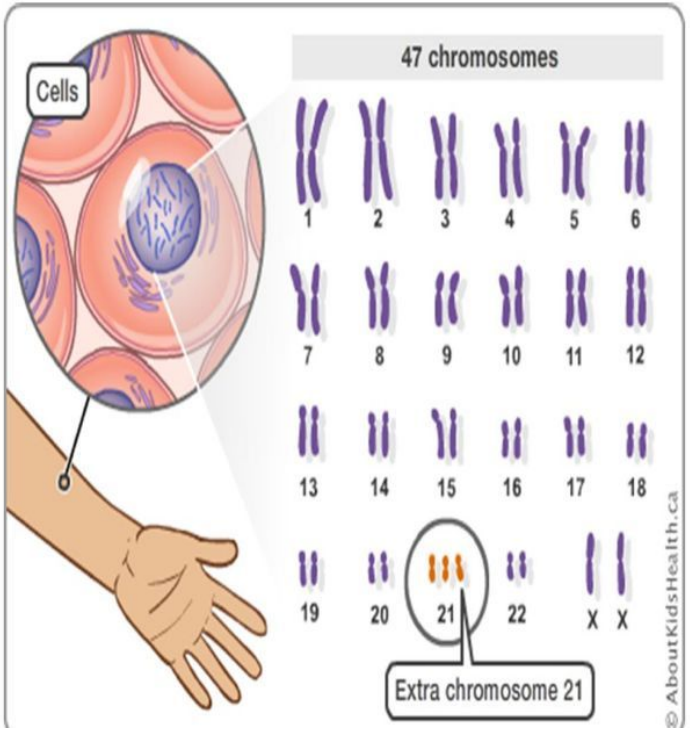
  III) Multifactorial (complex trait) **4.7%**

Atypical:

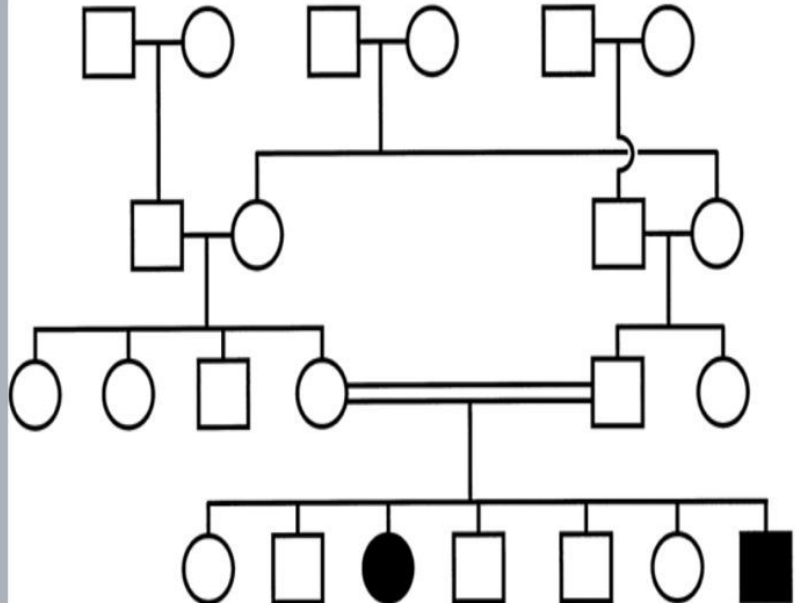
- Mitochondrial, UPD, imprinting, germline mosaicism

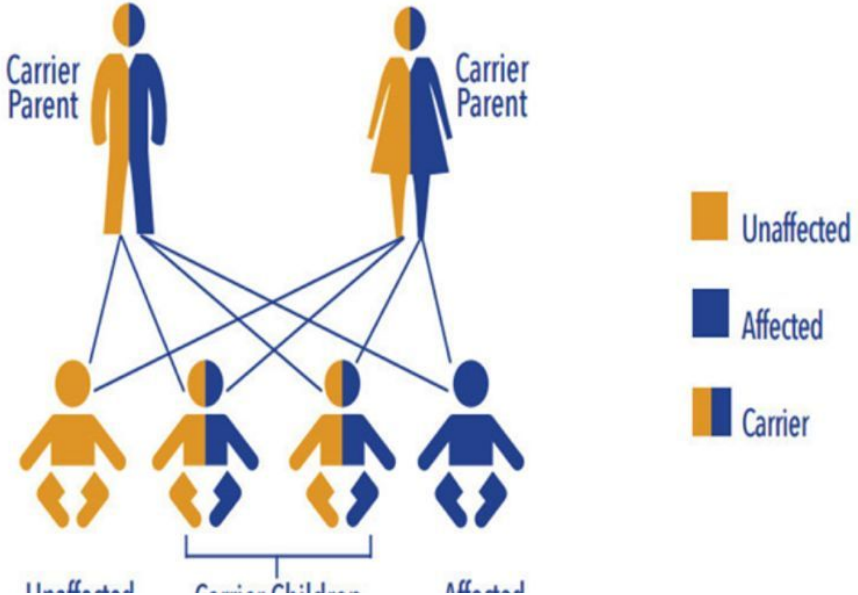
Typical inheritance

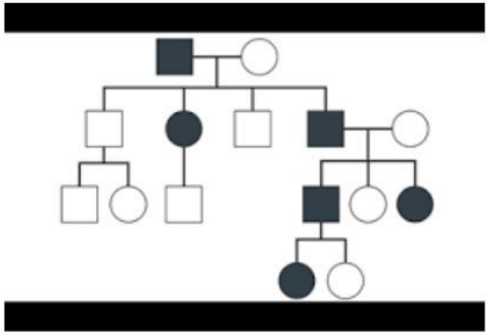
- Chromosomal defect.
- Down syndrome
- Turner syndrome.
- Klienfilter syndrome
- XYY chromosomes

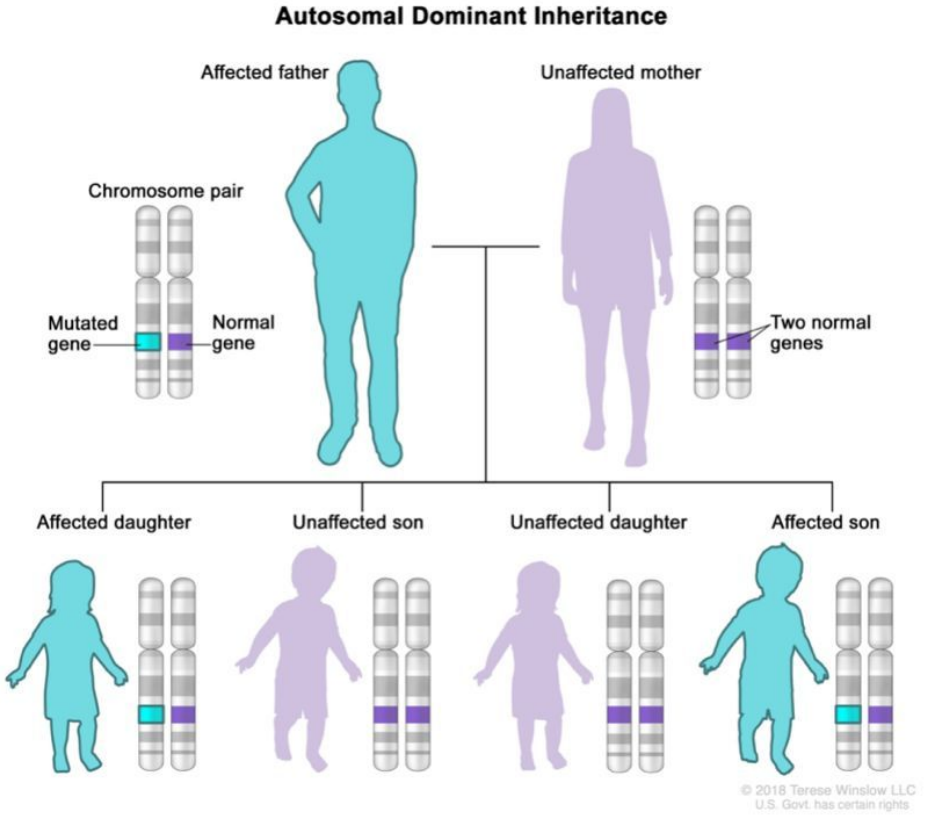


Autosomal recessive, AR (most common)





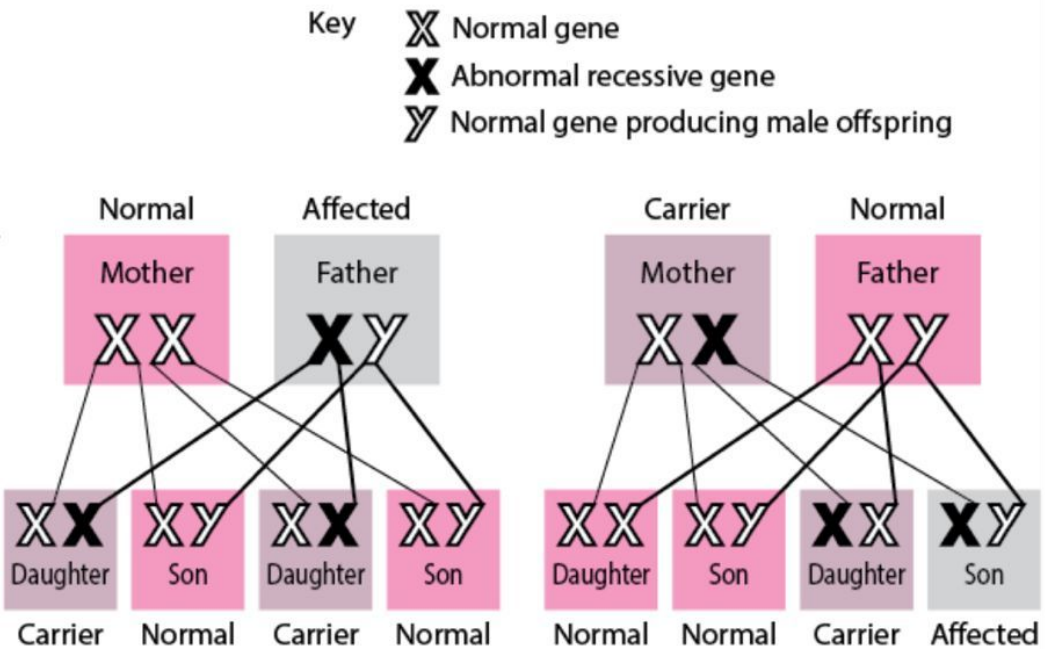




Achodroplasia
Hypochodroplasia
Neurofibromatosis
Spinocerebellar ataxia

X-linked Recessive XLR

Color blindness
Hemophilia A&B
Duchenne AND Becker MD.
X linked ichthyosis
X linked agammaglobulinemia
Glucose 6 phosphate dehydrogenase deficiency
Lesch-Nyhan syndrome
Hunter syndrome
Testicular feminization syndrome
Menkes syndrome.
Emery-Dreifuss MD



X-linked Dominant XLD

Vitamin D resistant rickets X-linked hypophosphatemia.

Rett syndrome (95% of cases are due to sporadic mutations)

Fragile X syndrome

Alport syndrome: nephropathy and deafness

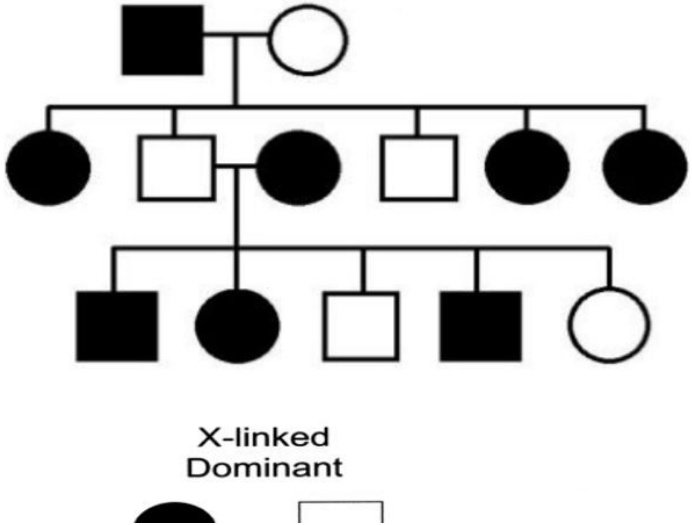
85% X-linked dominant

15% are autosomal recessive.

Autosomal dominant inheritance is rare

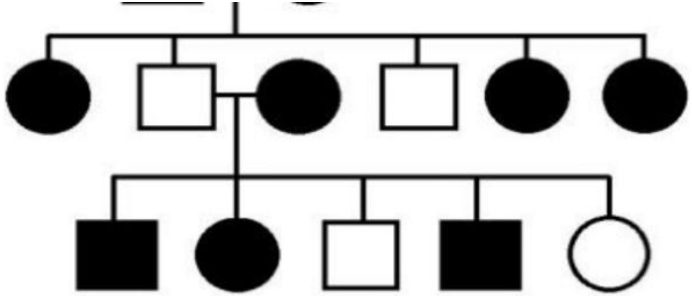
Incontinentia pigmenti.

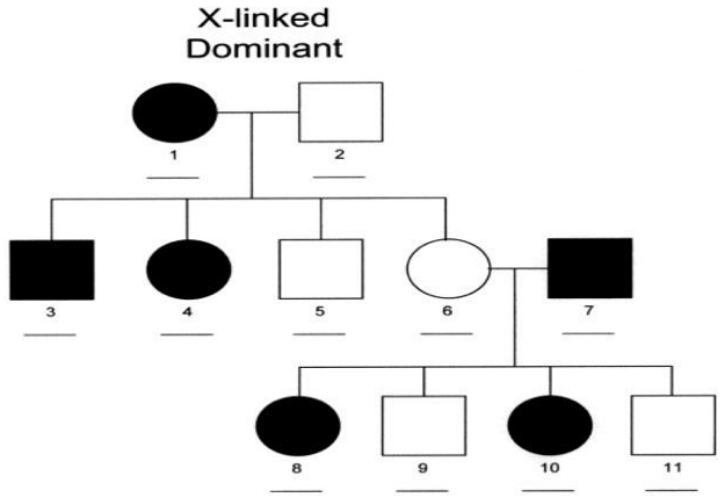
If father is affected his sons will not be affected



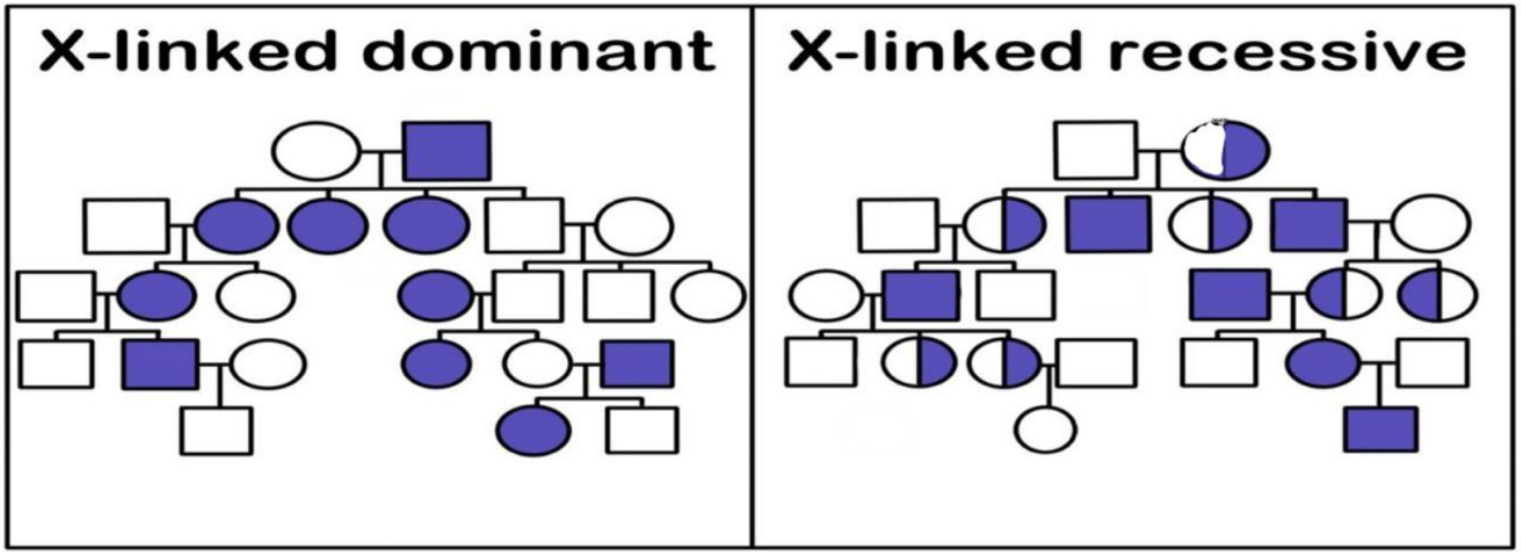
due to sporadic mutations)

- **Fragile X syndrome**
- **Alport syndrome:** nephropathy and deafness
  - 85% X-linked dominant
  - 15% are autosomal recessive.
  - Autosomal dominant inheritance is rare
- **Incontinentia pigmenti.**
- **Goltz syndrome**. Focal dermal hypoplasia
- **X-linked dominant porphyria.**
- **Aicardi Syndrome**: A triad of
  - Agenesis of corpus callosum
  - Coloboma (choroidal lacunae).
  - Hypsarrhythmia





XLD and XLR



III) Multifactorial (complex trait)

- Multiple factors (genetic & environmental)
- purely genetics (polygenic)

- It can be measured like Ht, Wt, B.P & S. cholesterol,and skin pigmentation

- All inherited as Multifactorial traits

Diseases transmitted as Multifactorial traits

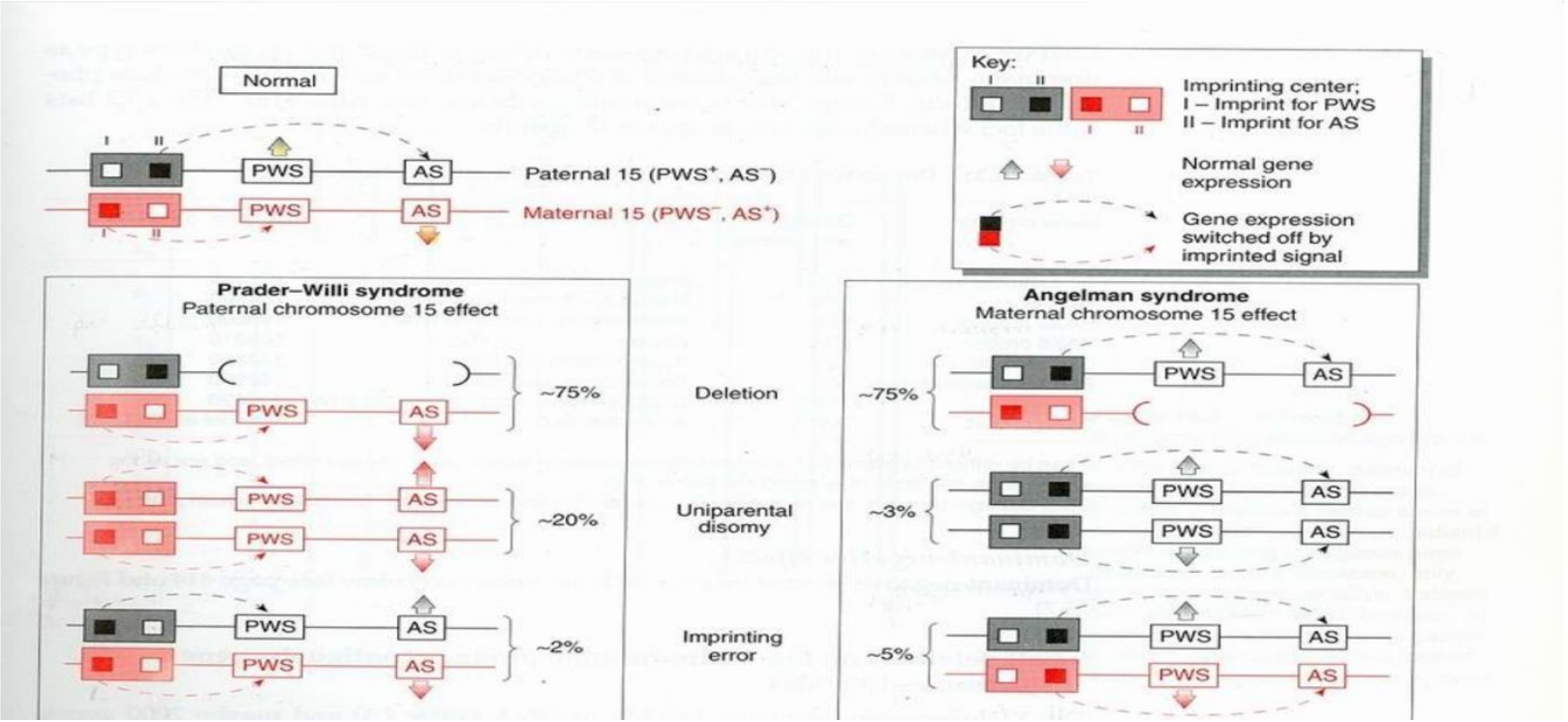
- Isolated congenital anomalies e.g.
  - Cleft lip/ palate
  - congenital heart diseases
  - Anencephaly
  - Pyloric stenosis
- Diseases of adulthood: e.g.

  DM, arteriosclerosis, asthma,MS …

Atypical Inheritance

- Uniparental disomy UPD
- imprinting (epigenetics)
- germline mosaicism
- Mitochondrial

Prader-Willi/ Angelman syndromes



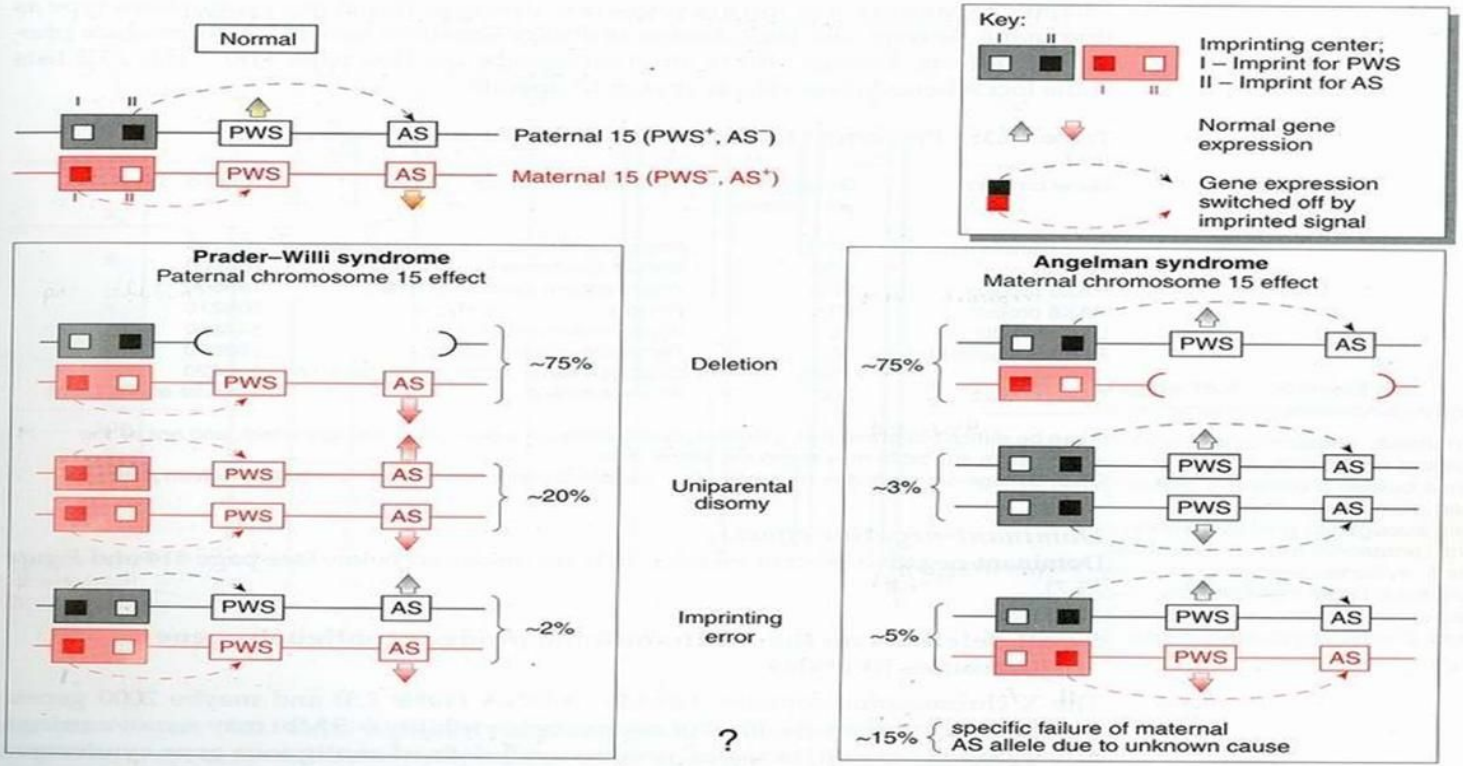


Figure 15.3: Pathogenic mechanisms in Prader–Willi (PWS) and Angelman (AS) syndromes.

PWS and AS are caused by lack of expression of their respective genes. These lie close together on chromosome 15. Deletions (usually encompassing both genes) are the commonest cause of either syndrome (top lines in boxes). However, only deletion or nonexpression of the paternal copy of PWS (black) or the maternal copy of AS (red) has any effect, because the other alleles are normally silenced by an imprinting center located some distance away (dashed arrows). If one homolog is missing becuase of uniparental disomy (middle lines in boxes), the effect is the same as deletion. Rarely, an imprinting error mimics the effect of uniparental disomy (bottom lines in boxes). Some cases of AS appear to result from specific nonexpression of the maternal AS gene, without the methylation pattern associated with a paternal imprint. See Lalande (1994) for further details.

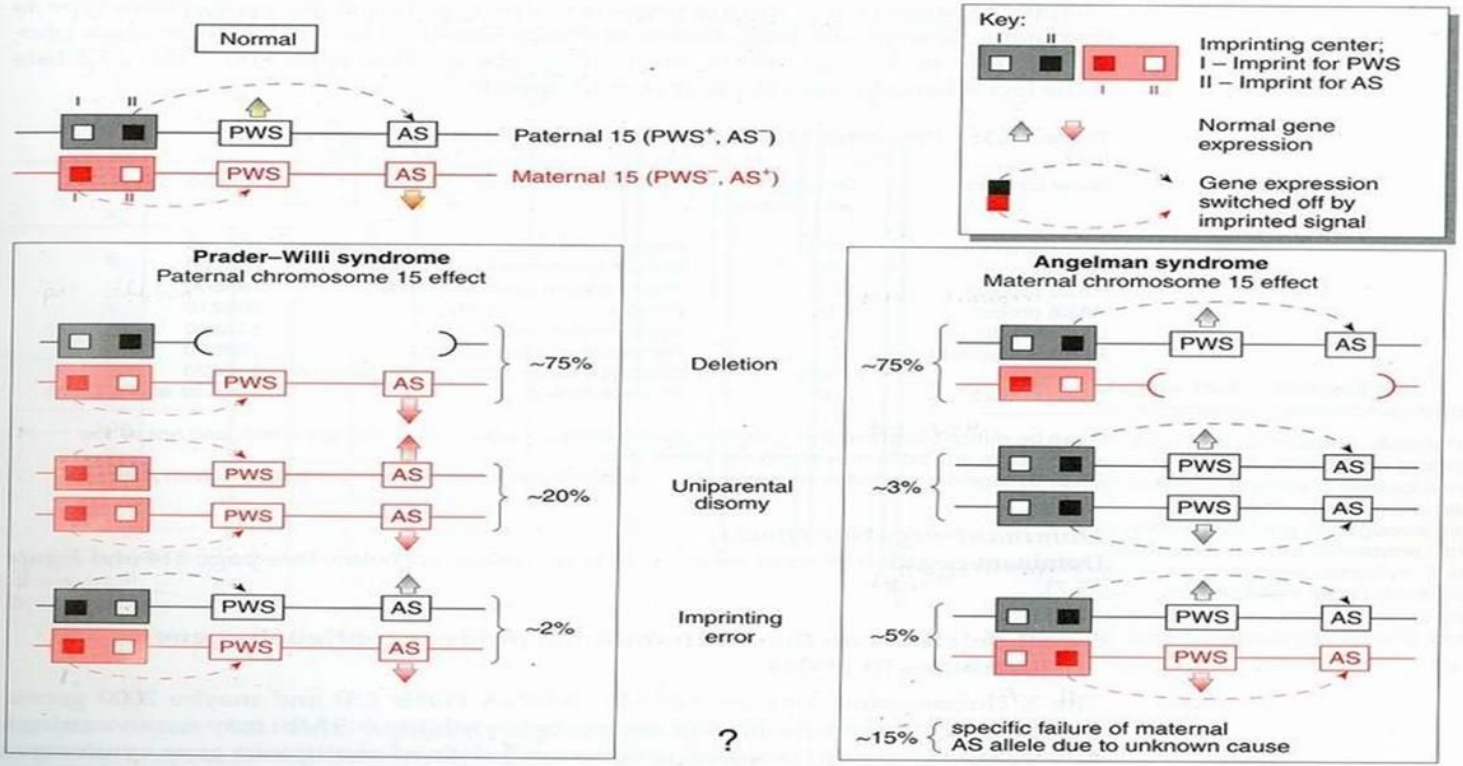


Figure 15.3: Pathogenic mechanisms in Prader–Willi (PWS) and Angelman (AS) syndromes.

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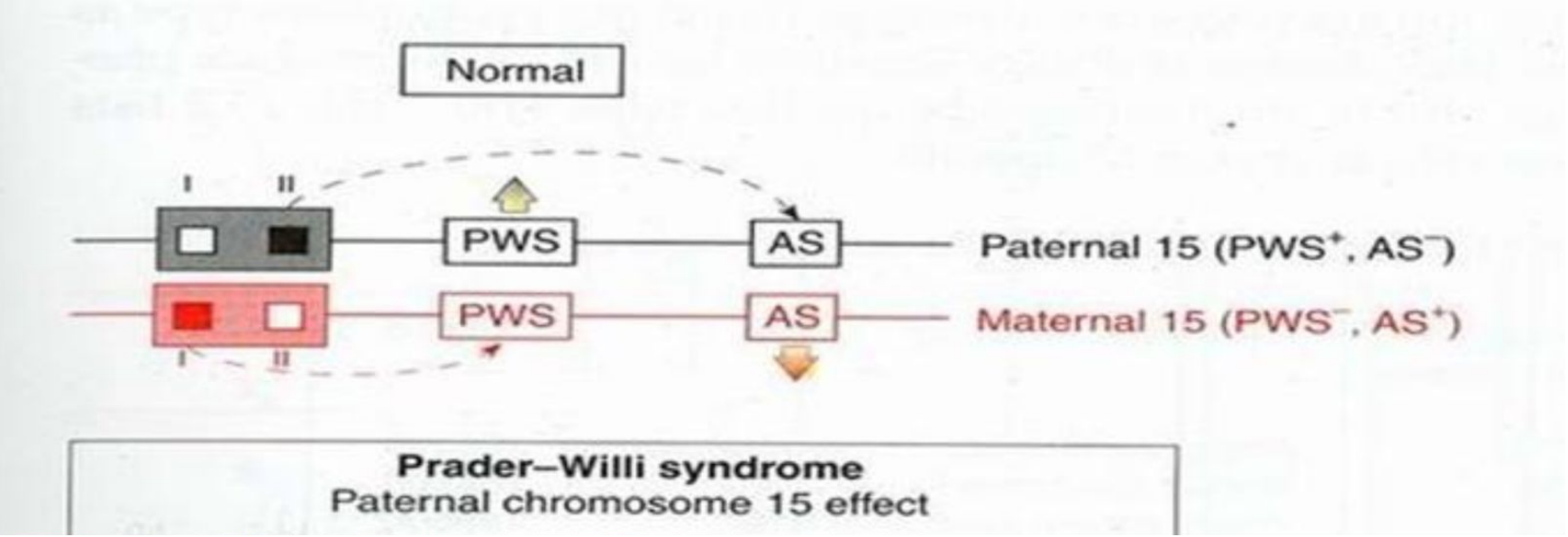
Some of them told me that they didn’t understand the above mechanism of mutations that result in PWS/AS

Here , I divided the figure and explained each mechanism.



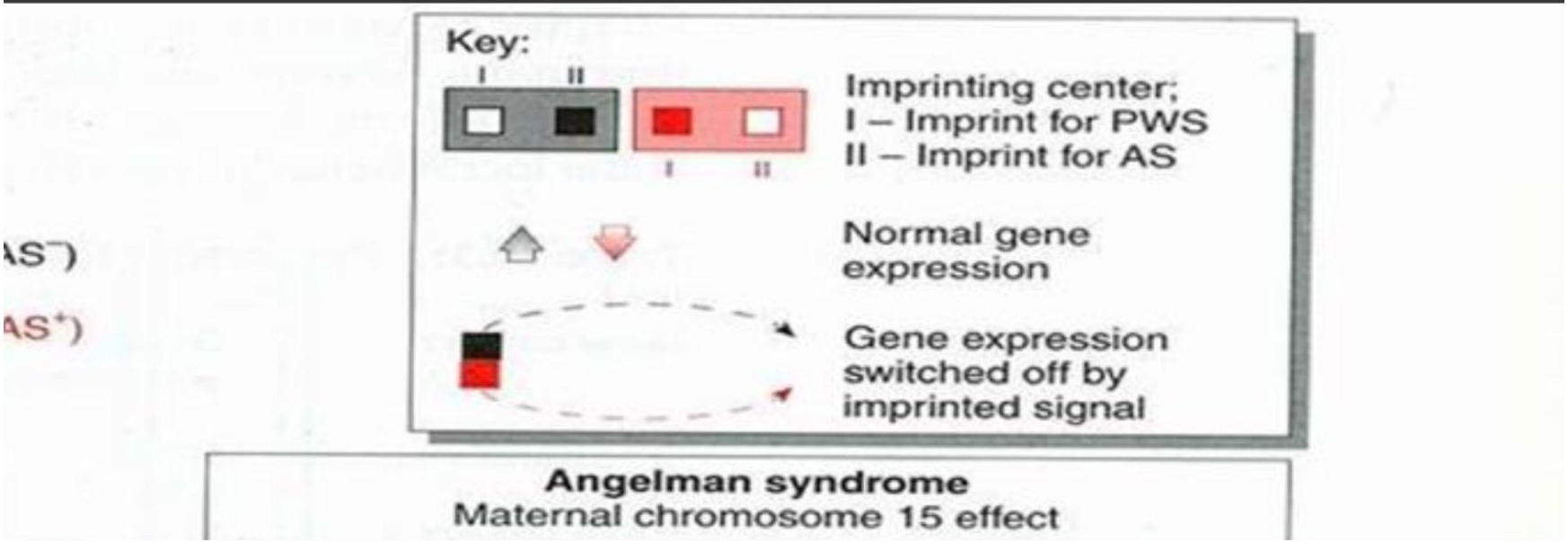
PWS and AS are not caused by single gene mutation, rather they are caused by lack of expression of their respective genes. These lie close together on chromosome 15.

Lack of expression is the result of:

-Deletion

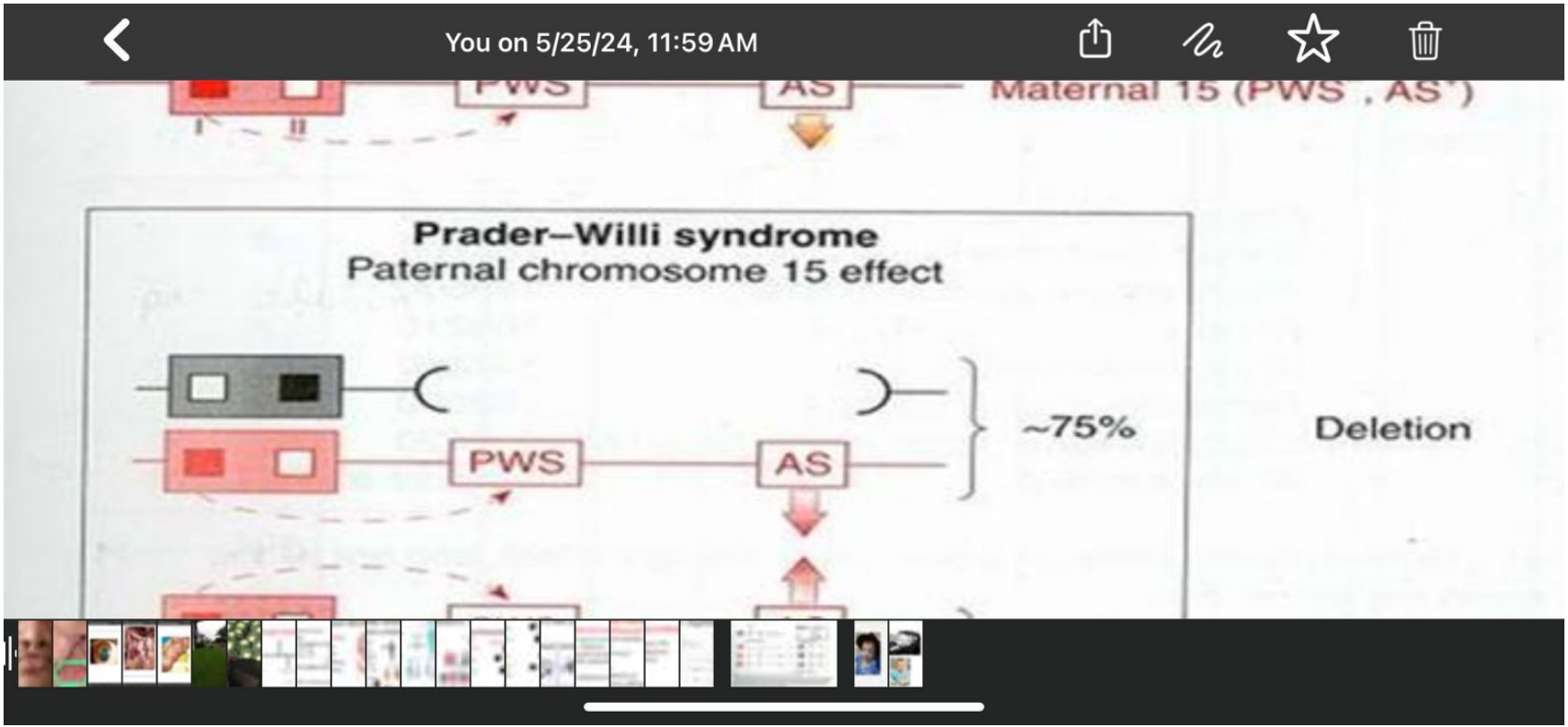
-UPD

-imprinting

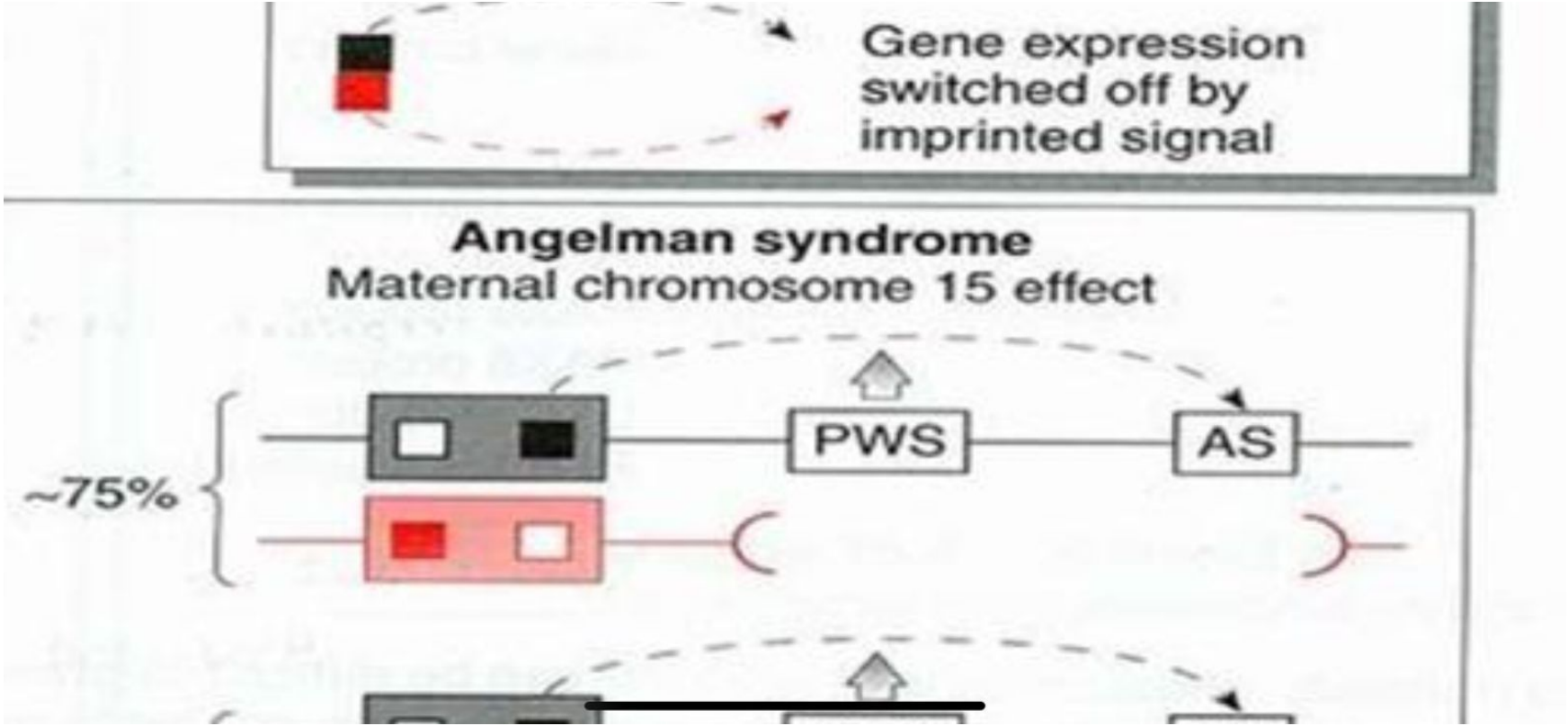


Imprinting centers for PWS (black)
Imprinting center for AS(red). They switch off genes that become inactive . deletion or nonexpression of the paternal copy of PWS (black) or the maternal copy of AS (red) has any effect,

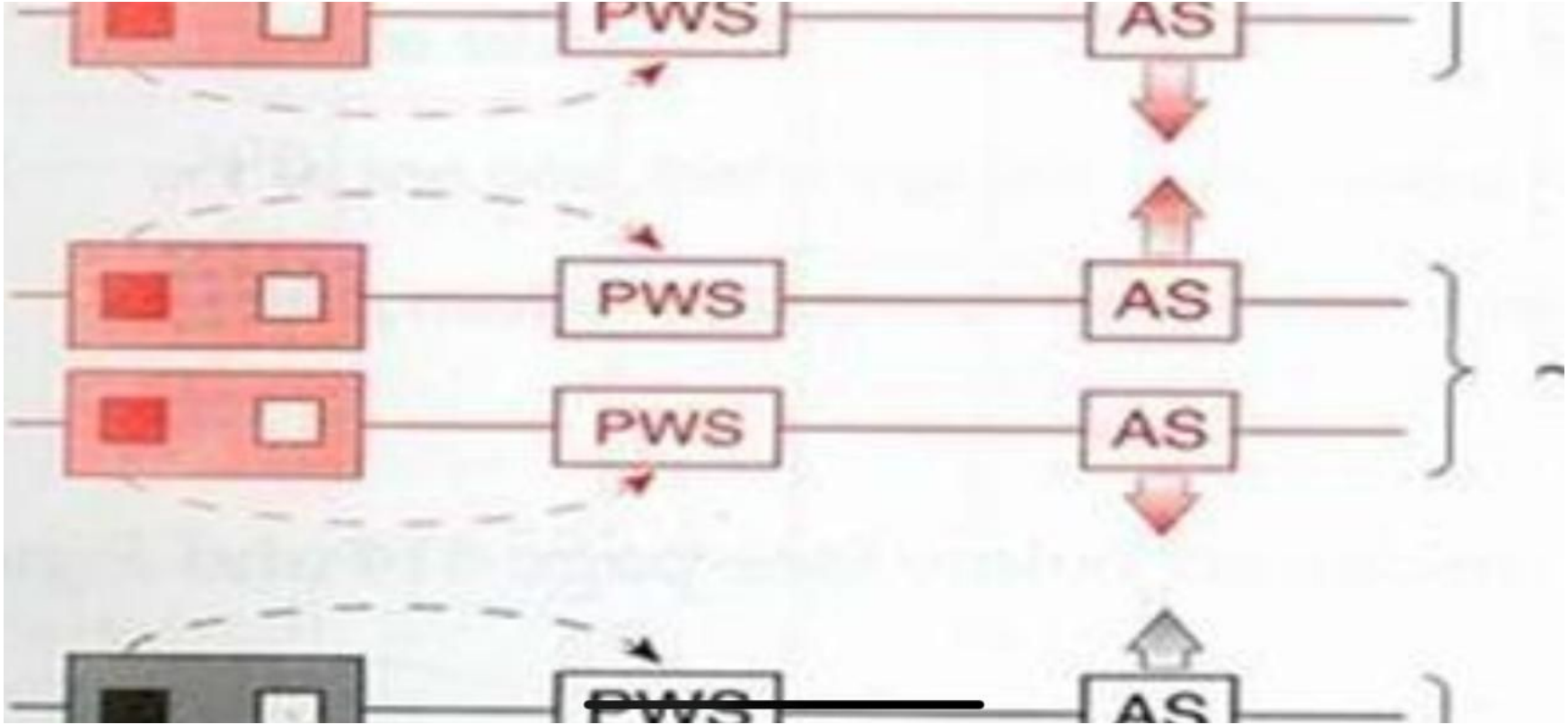
The deleted paternal will result in PWS 70%



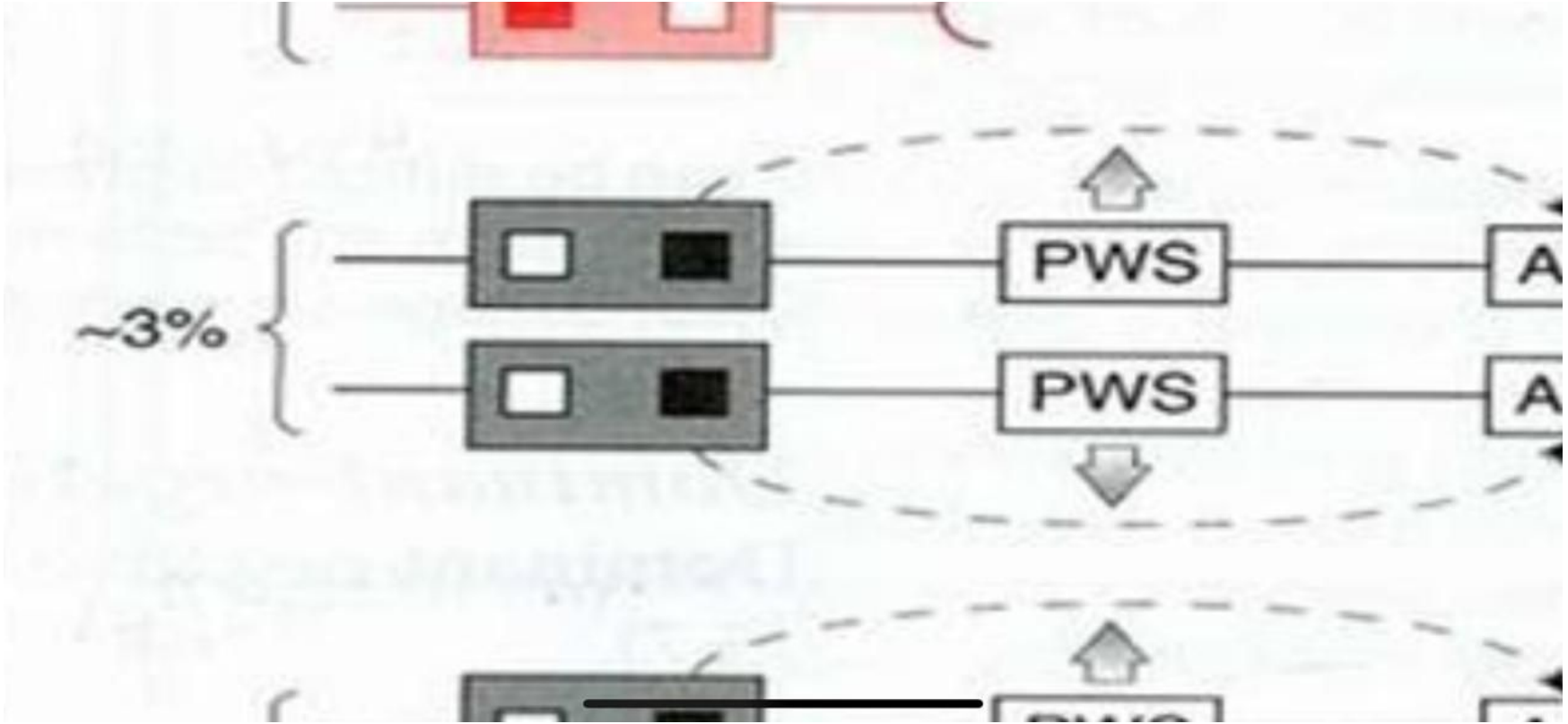
The deleted maternal segment swill result in AS in 75%



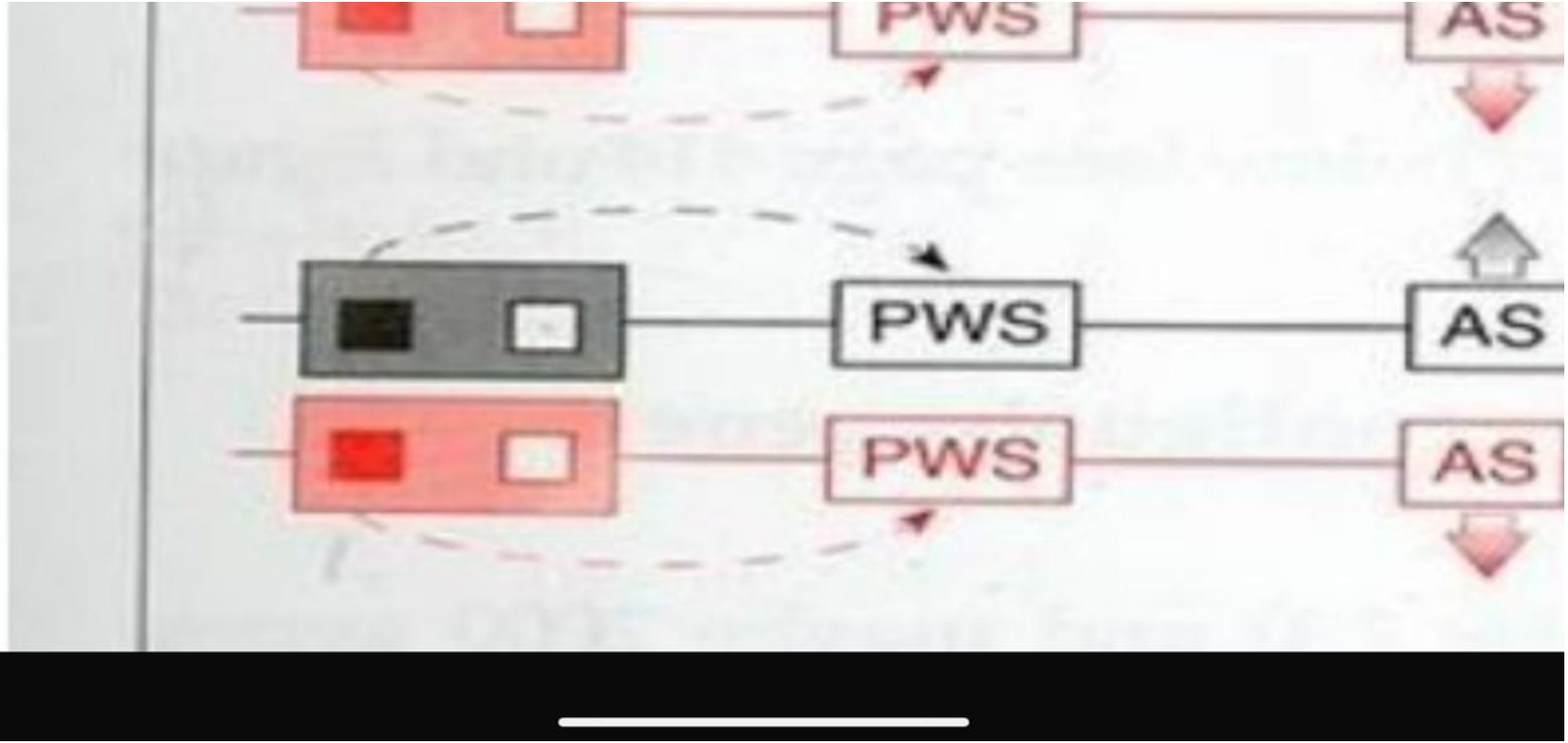
Another mechanism is unilateral disomy UPD. If both chromosome 15 are inherited from the mother .i.e no paternal contribution this will result in PWS



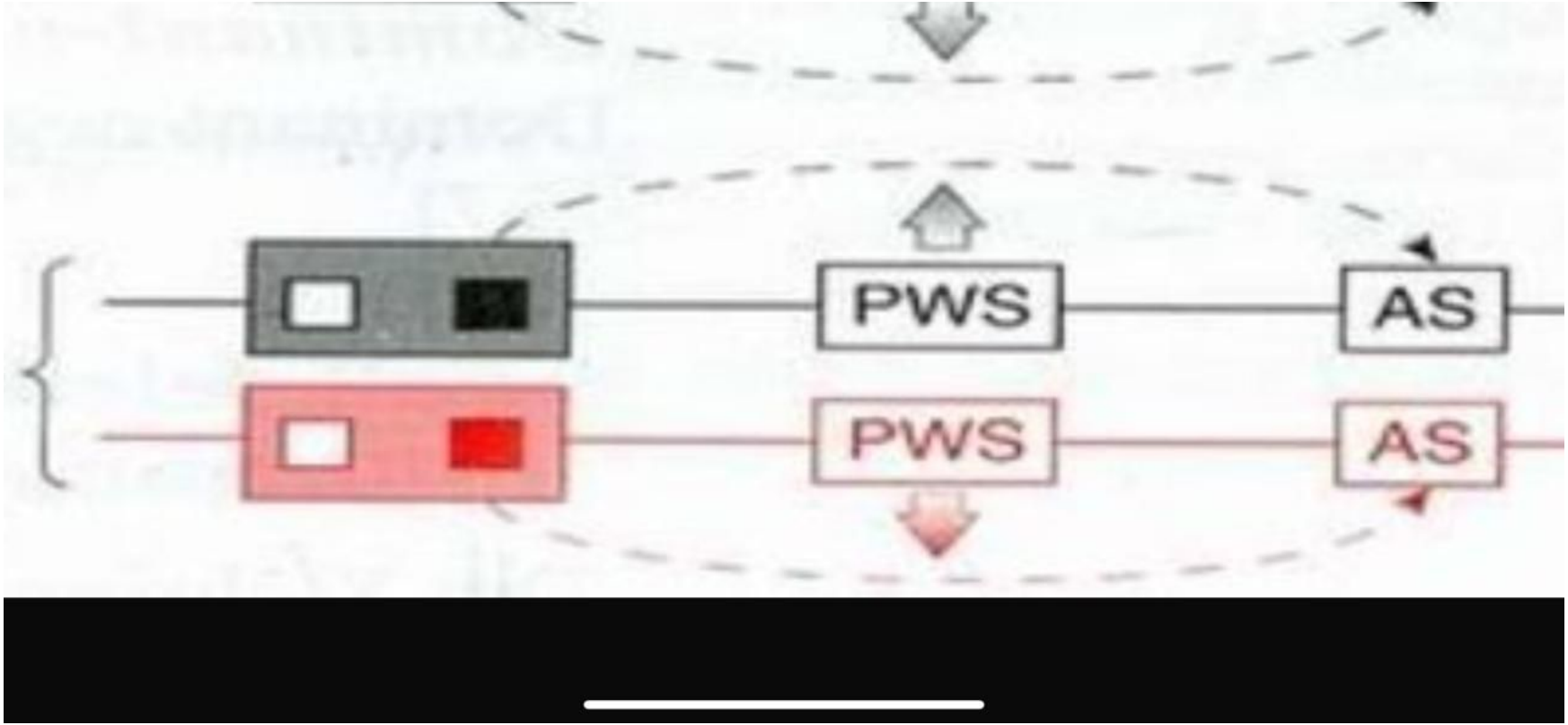
If both chromosome 15 are inherited from the father .i.e no maternal contribution this will result in AS.



The imprinting center on the paternal chromosome abnormally switched off the normal gene expression for PWS that became inactive
and will result in PWS



The imprinting center on the maternal chromosome abnormally switched off the normal gene expression for AS that became inactive
and will result in AS



Today's texts we will go over the types of inheritance that are atypical including:

-Mitochondrial

- Uniparental disomy UPD and imprinting (examples of PWS/AS).

Features of XL and AD inheritance

- germ line mosaicism

- penetrance

Feel free to ask questions tomorrow إن شاءالله

I) Mitochondrial inheritance:
•Present in every cell of the body (except RBC).
•Responsible for creating more than 90% of the energy
•Heart, brain, muscles, liver, and lungs are most affected organs.

1.Disorders with autosomal recessive patterns(nuclear mitochondrial diseases)
The protein is synthesized in the nucleus and has its function in the mitochondria)e.g.

Leigh syndrome

2. Disorders with pure mitochondrial patterns:
They have maternal inheritance. The mother will pass it to her offspring, but the affected father will not.
Examples:
a)Mitochondrial encephalopathy with lactic acidosis and stroke-like episodes (MELAS)
b) Myoclonic encephalopathy with ragged-red fiber (MERRF)
c) Neuropathy, Ataxia, Retinitis Pigmentosa (NARP)
d) Leber hereditary optic neuropathy
(DO NOT mix it with Leber congenital amaurosis which has autosomal recessive of inheritance and is not a mitochondrial disorder)
e) Kearns–Sayre Syndrome (KSS)

3.The sperm mitochondria are lost during fertilization.

II) Uniparental disomy (UPD) is the abnormal situation in which both members of a chromosome pair are inherited from one parent, and the other parent's chromosome for that pair is missing.
e.g
Prader Willi syndrome and Angelman syndrome

III) . Genomic imprinting is the process by which only one copy of a gene in an individual (either from their mother or their father) is expressed, while the other copy is suppressed. Unlike genomic mutations that can affect the ability of inherited genes to be expressed, genomic imprinting does not affect the DNA sequence itself. Instead, gene expression is silenced by the epigenetic addition of chemical tags to the DNA during egg or sperm formation. Epigenetic tags on imprinted genes usually stay in place for the life of the individual.
e.g
Prader Willi syndrome and Angelman syndrome

IV) Germline mosaicism
The inheritance pattern in cases where multiple affected offspring are born to clinically,and phenotypically “normal”parents who carry the mutation only on germ cells, but not in the blood.
Examples of germ-line
mosaicism include :

X-linked or dominant genetic disorders
e.g. X-linked:
Duchenne muscular dystrophy
hemophilia A or B
Autosomal dominant: osteogenesis imperfecta, tuberous sclerosis.

-Penetrance: is the proportion of individuals carrying a particular gene (genotype) that also expresses an associated trait (phenotype).
The penetrance of a disease causing mutation is the proportion of individuals with the mutation that exhibit clinical symptoms among all individuals with such mutation.
For example: If a mutation in the gene responsible for a particular autosomal disorder has 75% penetrance, then 75% of those with the mutation will go on to develop the disease, showing its phenotype, whereas 25% will not. E.g. a child with
polydactyly whose parents don’t have polydactyly, but the grandparents have . The parents have the mutation ,but it’s non penetrant and they pass it to their child who will show the disease.

In Prader-Willi syndrome (PWS): Choose the INCORRECT answer:

a)Less than10% of these patients have de novo microdeletions of chromosome 15

b)The deletion always occurs on the paternally derived chromosome

c)Deletion of the maternal chromosome 15 will give rise to Angelman Syndrome

d)PWS genes are normally silenced on the maternal chromosome 15

e)Uniparental disomy can be a cause for PWS.

Incorrect answer:a)
More than 75% is due to deletion

A dominantly inherited trait affects a child and his grandmother, but neither parent. This best illustrates which of the following principles?

A Variable expressivity
B New mutation
C Somatic mosaicism
D Nonpenetrance
E Germline mosaicism

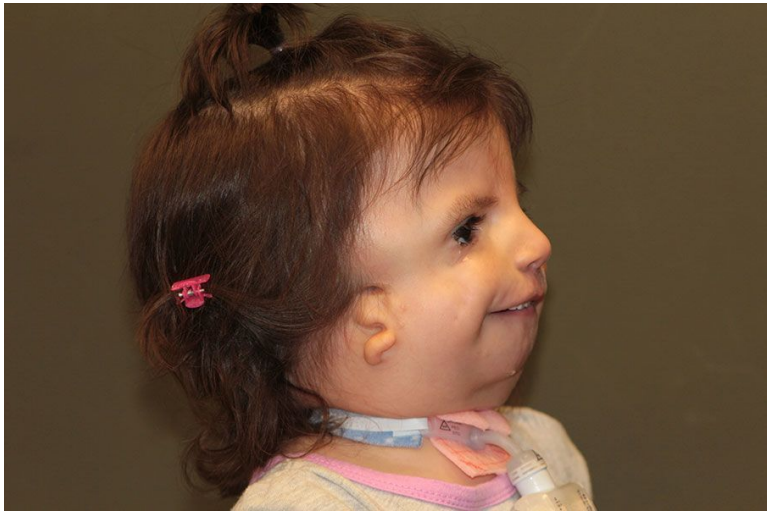
Answer: D)
A skipped generation for a dominant trait is an example of nonpenetrance. Variable expressivity would result in different levels of expression in different individuals who carry the gene. Somatic mosaicism would not occur in the child's parent, since the parent who inherited the trait from the grandmother would have the mutation in all cells.

A family had 3 kids
affected with
Treacher Collins syndrome which is an autosomal dominant condition.
Non of the parents found to be carrier
The possible cause is :

A Variable expressivity
B New mutation
C Somatic mosaicism
D Nonpenetrance
E Germline mosaicism

Answer: E) gremline mosaicism should be mentioned to all parents who have de novo mutation. The mutation might be present in the gonadal cells

What is this syndrome?



Treacher Collins syndrome.

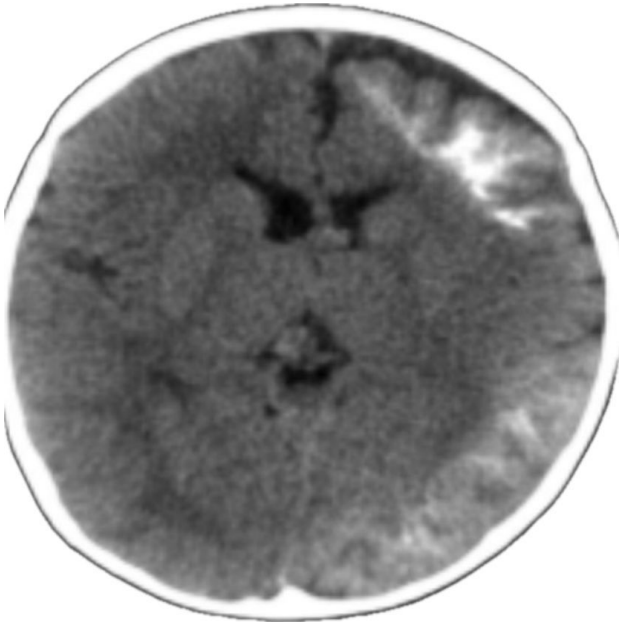
Autosomal dominant
Normal mentality
Cleft palates
Hearing loss

A 17 years old girl presented with primary amenorrhea.
she has features of Turner syndrome.
What is the most important investigation to do:
a) Prolactin hormone level
b) chromosomes study with FISH for X chromosome
c) chromosomes study with FISH for Y chromosome
d) Bone age
e) MRI of the pituitary gland

c) chromosomes study with FISH for Y chromosome in order to find any Y chromosome material and prevent the risk of developing dysgerminoma.

This 20-month-old child has a history of a facial nevus flammeus on the left side of their face and is now presenting with seizures. Taking into account the findings seen on the accompanying CT, what underlying condition are they most likely to have?

a)cerebral arteriovenous malformation
b)Parry-Romberg syndrome
c)Rasmussen encephalitis
d)Sturge-Weber syndrome —
e)TORCH infection



Answer: d)Sturge-Weber syndrome.
facial hemangioma and seizure

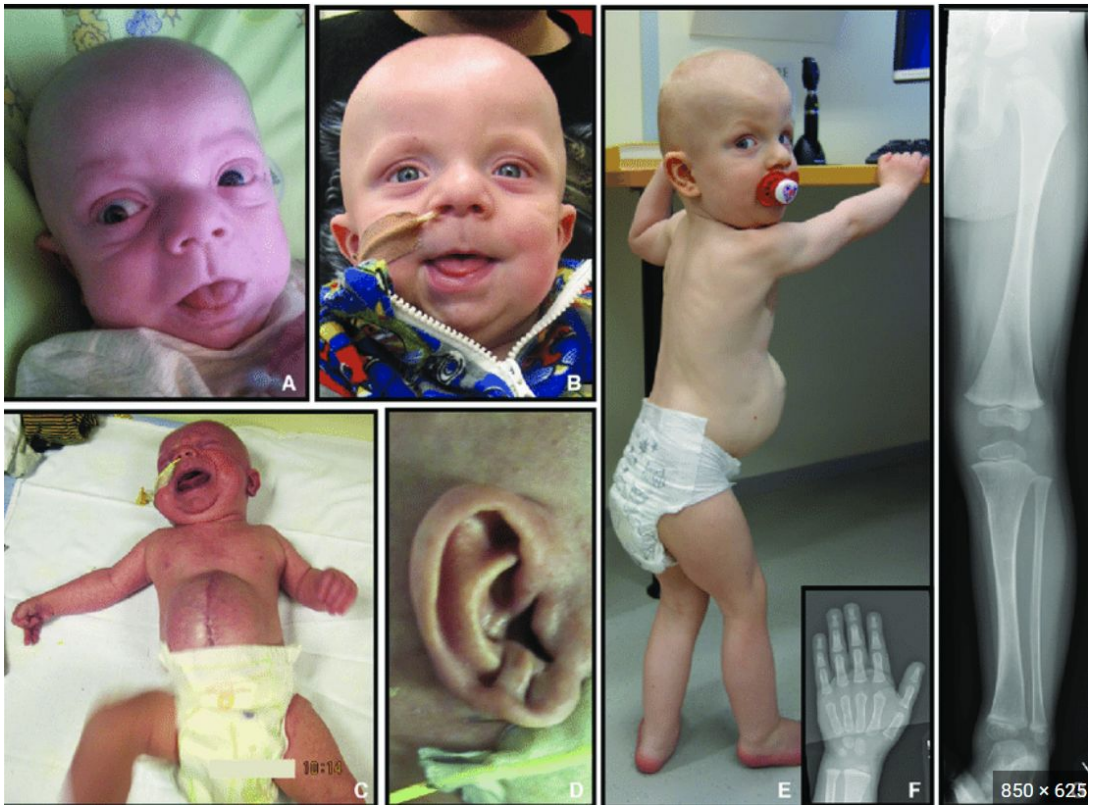
a)cerebral arteriovenous malformation patients can have seizures, but not the mean clinical presentation
b)Parry-Romberg syndrome. They can have seizures, there is facial muscle atrophy
c)Rasmussen encephalitis: they have seizures , but not dysmorhic
e)TORCH infection

A 17 years old girl presented with primary amenorrhea.
she has features of Turner syndrome.
What is the most important investigation to do:
a) Prolactin hormone level
b) chromosomes study with FISH for X chromosome
c) chromosomes study with FISH for Y chromosome
d) Bone age
e) MRI of the pituitary gland

c) chromosomes study with FISH for Y chromosome in order to find any Y chromosome material and prevent the risk of developing dysgerminoma.

This infant has the following features Except:

a) Omphalocele
b) hyperglycemia
c) Macrosomia
d) Visceromegaly
e) Macroglossia



Answer: b) hyperglycemia. An infant with Beckwith- Wiedmann syndrome.

Note:
"Paternal" duplication of the region on chromosome 11p15.5 results in Beckwith-Wiedemann syndrome (BWS).

While "Maternal" duplications of 11p15.5 results in Silver-Russell syndrome (SRS).

The father naturally wants a big baby (BWS), while the mother wants a smaller baby to fit in the uterus.

RSS also result from
maternal UPD of chromosome 7 where there is no paternal contribution

A 7-month-old girl presented with a 4-week history of recurrent tonic spasms that occurred daily, predominantly upon awakening. She is able to roll over, however, is not sitting yet. On examination she is microcephalic. Her eye exam showed retinal lacunae. Brain MRI showed absent corpus callosum
The mode of inheritance is:

a) Autosomal recessive
b) Autosomal dominant
c) X linked recessive
d) X linked dominant
e) mitochondrial inheritance

Answer: d) she has Aicardi syndrome

A 20-week-old female fetus was aborted. Physical examination reveals cystic hygroma. Most likely diagnosis:
a)Turner syndrome
b)Down syndrome
c)Noonan syndrome
d)Trisomy 18
e)Trisomy 16.

ANSWER: a. 80% of down syndrome will be aborted. 99% of Turner syndrome

A 3 yrs. old Saudi boy with blue eyes. No family history of colored eyes.
He most likely has:
a)Heart defect
b)Kidneys defect
c)Hypoglycemia
d)deafness
e)Ambiguous genitalia

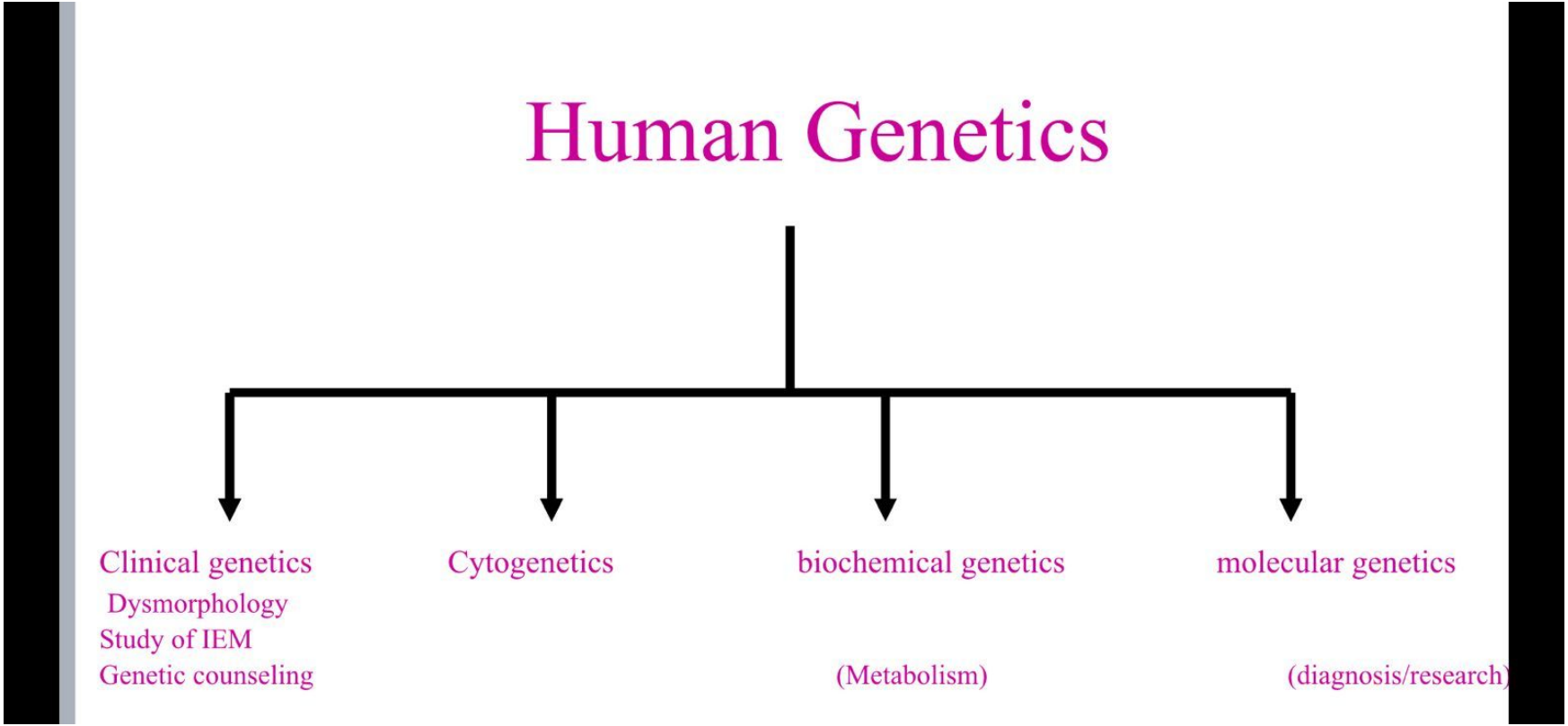
Answer: d) deafness
He most likely has :
b)Waardenburg syndrome

What are other disorders that have X-linked dominant inheritance?

Fragile X syndrome
Rett syndrome
Alport syndrome
Hypophosphatemic rickets

Rett and Aicardi syndromes are typically fatal for males before birth(IUFD)or during the first few weeks of life.

Reminder about the classification of medical genetics



This is a reminder of the mode of inheritance. Here is a text on multifactorial inheritance from the Nelson textbook.

Typical:

- Major types of genetic diseases:
  - I) **Chromosomal** 0.19%
  - II) **Single gene (monogenic or Mendelian disorders)**
    - Autosomal recessive, AR 0.17% (most common)
    - Autosomal dominant, AD 0.14%
    - X-linked, XL 0.05%
  - **III) Multifactorial (complex trait)** **4.7%**

Atypical:

- Mitochondrial, UPD, imprinting, germline mosaicism

Multifactorial inheritance refers to disorders that are caused by a combination of genetic, and environmental factors. It differs from the monogenetic inheritance (autosomal recessive, autosomal dominant or X linked recessive and dominant)

Multifactorial inheritance which the most common cause of isolated major anomalies observed in the newborn.

Examples include

- [ ] neural tube defects
- [ ] heart defects
- [ ] Pyloric stenosis (common in males
- [ ] Cleft lip/ palate (common in males)
- [ ] clubfoot
- [ ] Congenital dislocation of the hips (common in females)

Other multi factorial conditions include

Adult onset diseases: schizophrenia. Type 2 diabetes mellitus, MS and,asthma..

Empiric risks o f recurrence for most isolated major anomalies are typically in the range of 2-6%.

In general, a multifactorial disease occurs when enough"bad" factors overcome the " good" factors. Some refer to these bad factors as " liability" factors. In other words, enough liability factors must be present to exceed a threshold to result in the disease.

For some diseases, this threshold varies depending on the gender.
A good example is pyloric stenosis. Pyloric stenosis
normally occurs in about 1/1,200 females and about
1/300 males. This indicates that the “ threshold” for this
disease is much higher in females than males. In other
words, for a female to get pyloric stenosis, she would
need to have an unusually high number o f liability factors present, especially compared to the case for a male.
So, when a female does, in fact, get pyloric stenosis,
it means she has more o f these “ bad” factors, and the consequence is that her offspring are much more likely to have this disorder—even more likely than the offspring of an affected male (who presumably would have pyloric stenosis with fewer liability factors present in the first place).
Knowing this, let’s consider a woman with a history o f pyloric stenosis as a child. Are her boys or her girls more likely to be affected? Boys!
Why? Because
it takes fewer liability factors— “ fewer hoops to jump through”—for males to develop the disease.
When the mother is transmitting enough o f these factors (remember, we said this is a mother with a history o f pyloric stenosis), her son is more likely than her daughter to reach the threshold.
the risk to the son of an
affected female with infantile pyloric stenosis is 18%, compared
with the 5% risk for the son of an affected male.

The likelihood that both identical twins will be affected with the same malformation is less than 100% but much greater than the chance that both members of a nonidentical twin pair will be affected. This is in contrast with the pattern seen in mendelian inheritance, in which identical twins almost always share fully penetrant genetic disorders.

◆ The risk of recurrence is increased when multiple family members are affected. A simple example is that the risk of recurrence for unilateral cleft lip and palate is 4% for a couple with 1 affected child and increases to 9% with 2 affected children. It is sometimes difficult to distinguish between a multifactorial and mendelian etiology in families with multiple affected individuals.

◆ The risk of recurrence may be greater when the disorder is more severe. For example, an infant who has long-segment Hirschsprung disease has a greater chance of having an affected sibling than the infant who has short-segment Hirschsprung disease. Another example is the recurrence risk is higher if the index case has bilateral cleft lip than if he/she has unilateral CL

A 6-year-old boy with Down syndrome is diagnosed with acute appendicitis. The anesthesiologist may require the following investigations prior to general anesthesia:

a) Echocardiogram
b) EKG
c) Lateral neck x-ray
d) Upper GI series
e) Barium enema

Answer :c) Lateral neck x-ray

2) Gonadoblastoma may occur in the following conditions:
a) Down syndrome
b) Turner syndrome
c) Trisomy 18
d) Trisomy 13
e) Klinefelter syndrome

Answer: b) Turner syndrome
As we mentioned before, if the patient harbors Y chromosome material, it is necessary to remove the gonads to prevent the risk of developing gonadoblastoma

All of the following statements are true about X-linked recessive inheritance EXCEPT :

a) Incidence is much higher in males than in females.

b) This disorder is less common in females with Turner syndrome.

c) The gene is transferred from an affected man to all his daughters.

d) The gene is never transmitted from father to son.

e) A significant portion of sporadic cases are due to new gene mutations.

Answer :
b) This disorder is less common in females with Turner syndrome.
Actually it’s the opposite Turner syndrome patients are at risk of manifesting the C linked diseases as they have only a single X chromosome

The following statement is NOT true about Williams syndrome:
a) Supravalvular aortic stenosis is present in about two-thirds of patients.
b) This syndrome is due to deletion of chromosome 7.
c) Most children have mild to moderate psychomotor retardation.
d) Narrowing of pulmonary arteries, renal arteries, and cerebral blood vessels may be present.
e) Hypercalcemia is due to hyperparathyroidism

Answer:
e) Hypercalcemia is due to hyperparathyroidism

Till now the mechanism of Hypercalcemia In William syndrome is unknown. Theories include increase calcium absorption from the gut . It advisable not to administer Vitamin D even at low doses

The most common cause of sensorineural hearing loss (SNHL) in children is:

a) Genetic
b) Congenital rubella infection
c) Congenital CMV infection
d) Ototoxic medication
e) Idiopathic

Answer: e) Idiopathic
loud noise is a common cause . You may select it if it’s among the options

1) All of the following conditions are autosomal recessive genetic causes of sensorineural hearing loss
EXCEPT :
a) Waardenburg syndrome
b) Usher syndrome
c) Pendred syndrome
d) Jervell -Lange-Nielsen syndrome
e) Bardet-Biedl syndrome

Answer: e) Bardet-Biedl syndrome. They don’t have deafness. It’s a syndrome of obesity,retinitis pigmentosa, and renal failure
There 4 types of Waardenburg syndrome some have recessive or dominant mode of inheritance

2) All of the following fetal conditions increase maternal serum alpha-fetoprotein (MSAFP) levels EXCEPT :
a) Trisomy 18
b) Meningomyelocele
c) Gastroschisis
d) Omphalocele
e) Congenital nephrosis

Answer: a) Trisomy 18
Other options there is usually leak of the fetal AFP to the maternal blood

3.) All of the following conditions cause adrenal calcifications EXCEPT:

a) Wolman disease

b) Neuroblastoma

c) Ganglioneuromas

d) Congenital adrenal hyperplasia

e) Waterhouse-Friderischsen syndrome

Answers: d) Congenital adrenal hyperplasia.

Waterhouse-Friderichsen syndrome (WFS) is a group of symptoms caused when the adrenal glands fail to function normally. This occurs as a result of bleeding into the glands. Meningococcemia is a life-threatening infection that occurs when the bacteria Neisseria meningitidis invades the blood stream.

Other causes include traumatic birth delivery resulting in bleeding into the adrenal glands

What is this syndrome?

Waardenburg syndrome .

-White forelock
-Hypocenter ocular fungus
Heterochromia is the common
Partial or complete
And can not be seen sometimes except if you examine nearly with slit lamp.

- Hearing loss

1) The following statement is NOT true about Noonan syndrome:
a) This syndrome occurs in males only.
b) Human growth hormone therapy improves the growth velocity.
c) Pulmonic valvular stenosis is the most common cardiac defect.
d)Hepatosplenomegaly can be present.
e) Factor XI and XII deficiencies can occur.

Answer: a) This syndrome occurs in males only. Turner syndrome occurs only in females

2.) The following statement is NOT true about Klinefelter syndrome:

a) Maternal age is advanced in most cases.

b) An extra X chromosome is maternal origin in majority of cases.

c) This syndrome is most commonly due to meiotic nondisjunction of an X chromosome.

d) Klinefelter syndrome is the most common chromosomal male anomaly associated with male infertility

e) Klinefelter syndrome and fragile X chromosome are the most common causes of male mental retardation

Answer: b) An extra X chromosome is maternal origin in majority of cases.

the extra X chromosome is of paternal origin in 50% to 60% of cases and of maternal origin in 40% to 50% of cases.
the incidence of 45,X , and 47,XXY have significant correlation with maternal age.
while the incidence of 47,XXX and 47,XYY have no correlation with maternal age

3) The risk of recurrence of DiGeorge syndrome if a mother has 22q11 deletion is:

a) 4%

b) 10%

c) 25%

d) 50%

e) 66%

Answer: d) 50%. The parents who are carriers for microdeletion syndromes will have
a 50% risk of having an affected offspring

microdeletion syndromes:
-Prader–Willi syndrome
-Angelman syndrome
-Neurofibromatosis I
-Neurofibromatosis type II
-Williams syndrome
-Smith–Magenis syndrome

Smith-Magenis syndrome is a rare disorder, yet they asked the residents about it during one exam

It is due to chromosome 17p deletion
They have dysmorphic features and deafness.
The most characteristic findings are the
Behavioral Psychiatric Manifestations
- Hyperactivity
- Polyembolokoilamania (insertion of foreign bodies into body orifices)
- Behavioral problems
- Self-destructive behavior
- Onychotillomania (pulling out nails)
- Wrist-biting
- Head-banging

Dear members,
We started in May 7th . We will continue with genetic MCQs till mid July, then we will start the metabolic MCQs

Also, I would like to inform you that today is the final day of our break until the 22nd.

It has come to my attention that your exam is scheduled for October 7th (a special date)
I sincerely wish you all the best and hope that you will achieve success, just like the heroes who braved the powerful
Al-Aqsa flood

The most common associated abnormality in Dandy-Walker malformation is:

a) Cerebellar ataxia
b) Delayed motor developments
c) Agenesis of posterior cerebellar vermis
d) Agenesis of corpus callosum
e) Hydrocephalus

Answer: e) Hydrocephalus (90% of cases); answers (a), (b), (c), and (d) are also associated abnormalities.

The most common cause of morbidity in patients with Marfan syndrome is:

a) Progressive aortic root dilatation
b) Scoliosis
c) Dislocated lens
d) Funnel chest
e) Progressive mitral valve prolapse

Answer: e) Marfan syndrome patients with progressive mitral valve prolapse appear with arrhythmias, endocarditis, cardiac failure, or thromboemboli

The most common cardiac defect in patients with Marfan syndrome is:

a) Aortic root dilatation
b) Aortic stenosis
c) Mitral valve prolapse
d) Mitral stenosis
e) Coarctation of aorta.

Answer: a) Aortic root dilatation

A routine physical examination of a newborn reveals a sacral dimple. All of the following conditions increase the possibility of spinal dysraphism EXCEPT:

a) The size is more than 5 mm
b) Associated with a mass
c) Associated with hair
d) Associated with a nevus flammeus
e) The distance from the anus is 2 cm.

Answer: e) A dimple that has increased distance from the anus (more than 2.5 cm) OR associated with hemangioma increases the possibility of spinal dysraphism

A newborn infant has lumbosacral meningomyelocele. He was born by cesarean section with Apgar scores of 9 and 9 at 1 and 5 minutes respectively. A physical examination reveals a mass (5 cm in diameter) without CSF leak. The treatment includes all of the following except:

a) Surgery should be performed without delay.

b) A careful evaluation and assessment of the genitourinary system is indicated.

c) A multidisciplinary team approach should be taken.

d) One individual should act as an advocate and coordinate the treatment program.

e) The parents must be given the facts about the baby's condition

Answer: c)
A multidisciplinary team approach should be done.

Which suture is most commonly involved in craniosynostosis?

a). Coronal suture

b). Sagittal suture

c). Lambdoid suture

d). Metopic suture

e). There is no prevalent suture

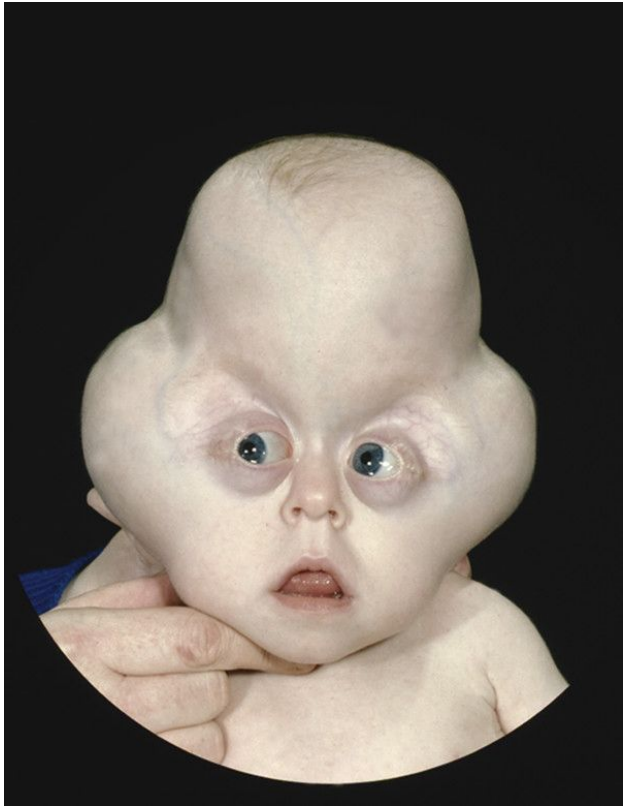
Answer : b). Sagittal suture

Though coronal sutures are involved in most of the genetic causes of craniosynostosis e.g.
There are several different types of craniosynostosis syndromes. These are the most common:

* Pfeiffer syndrome. Children with this type usually develop large thumbs or big toes, and in some cases.Some children may also experience neurological development issues.

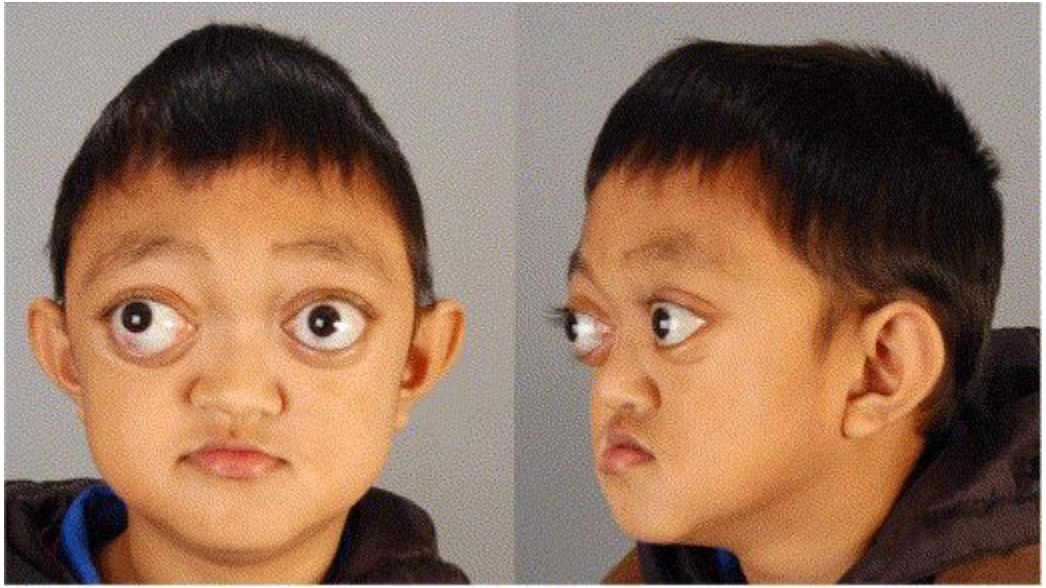
*Crouzon syndrome. Neurological development issues are rare but can occur in some cases. They have ocular proptosis

* Apert syndrome. Children with this syndrome also have syndactyly, or webbing, of the hands and feet



Cloverleaf skull
Pfeiffer syndrome

Crouzon syndrome



Apert syndrome.
In the exam,
they may show only the hands

A 1 yr.old boy ,mentally retarded, and blind. What test do you need to order:

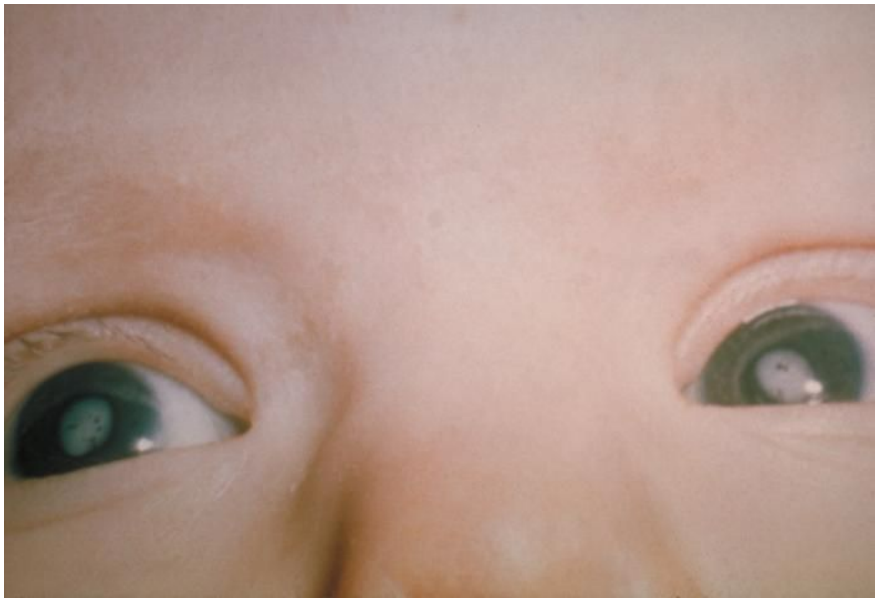
A.Thyroid profile

B. Galactose 1 phosphate,G1P level

C. Karyotyping

D. Brain MRI.

E. Very long chain fatty acids



ANSWER: B) he has complicated galactosemia

G1P is used to follow up on compliance

Most characteristic feature of neurofibromatosis (NF – 2):
a)Bilateral acoustic neuromas
b)Multicystic kidney
c) Mental retardation
d) Generalized seizures
e) Polycystic kidneys

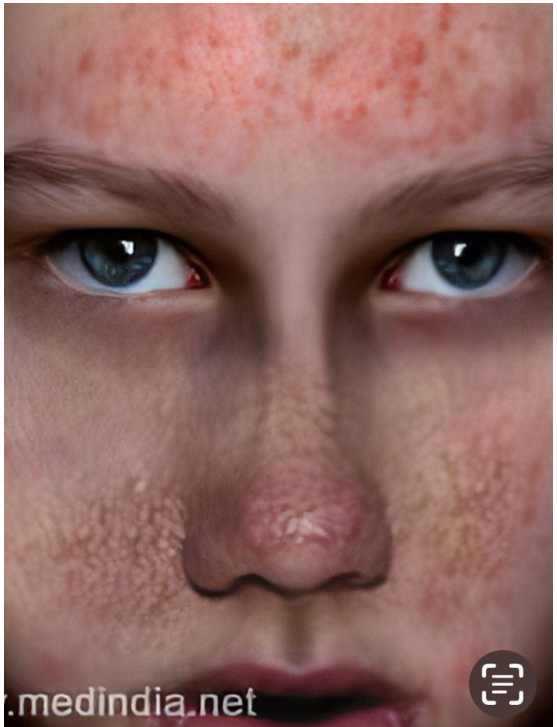
Answer:
a)Bilateral acoustic neuromas

Most common clinical presentation in tuberous sclerosis:
a)Shagreen patch
b)Seizure
c)Rhabdomyoma
d)Ash leaf
e)Mental retardation.

Answer: d)Ash leaf

A 17-year-old girl with borderline intellectual disability, seizures, and facial skin lesions as in her picture.
Her father has only the facial lesion. What is your diagnosis:

a) neurofibromatosis
b) Systemic lupus erythematosus (lupus)
c) Tuberous sclerosis complex (TSC)
d) Sturge Weber disease
e) Von Hippel-Lindau Disease.



Answer : c) Tuberous Sclerosis Complex

Note: Neurofibromatosis type 1 and 2 , Tuberous Sclerosis Complex, Sturge Weber disease, and Von Hippel-Lindau Disease are called
Phakomatoses, also known as neurocutaneous syndromes, are a broad group of congenital disorders that are characterized by hamartomatous lesions of the skin and the central and peripheral nervous systems.
Each disease has its unique presentation.
In this question, TSC is a dominant condition. The father has only angiofibroma

What are the chances of the offspring to have achondroplasia if both parents have achondroplasia?

(a) Less than 1%
(b) 100%
(c) 50%
(d) 25%
(e) 75%

Answer : (e) 75%

If both parents carry a dominant condition, the disease will be expressed, resulting in a 25% probability of having a severely affected offspring, a 25% likelihood of having a healthy child, and a 50% chance of having a child affected by the condition like them. An excellent illustration of this is hypercholesterolemia, which is inherited as a dominant condition. The parents will be heterozygous carriers for hypercholesterolemia, which can be managed through diet and medication, while their offspring may experience myocardial infarction during their teenage years.

For the treatment of Achondroplasia:
a) Growth hormone.
b) There is no effective therapy yet available
c) Limb-lengthening
d) modified recombinant human C-type natriuretic peptide (CNP).
e) Enzyme replacement therapy

Answer: d) modified recombinant human C-type natriuretic peptide (CNP).

It is imperative to have a comprehensive understanding of achondroplasia, which stands as the most prevalent skeletal dysplasia. Cases suitable for your OSCE can be readily identified.
Throughout my fellowship, I had the chance of meeting the renowned individual with achondroplasia, Dr. Michael Ain, a dedicated orthopedic surgeon who overcame numerous obstacles to pursue a career in orthopedic surgery.
https://pages.jh.edu/jhumag/0499web/ortho.html

I search to read his story

This is the back of a child
What does she have?

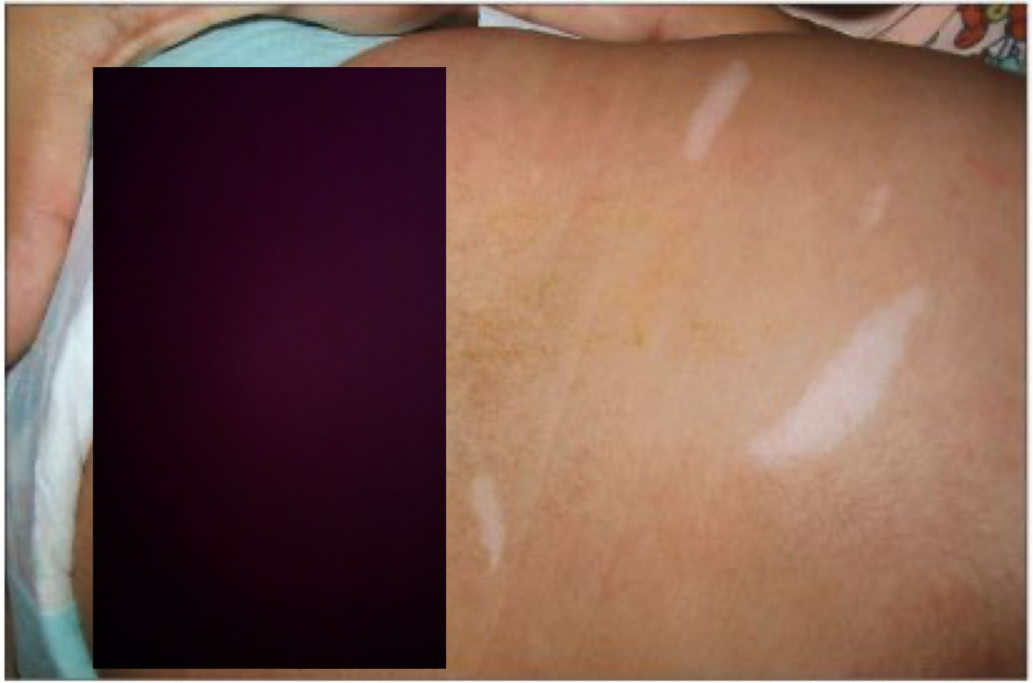
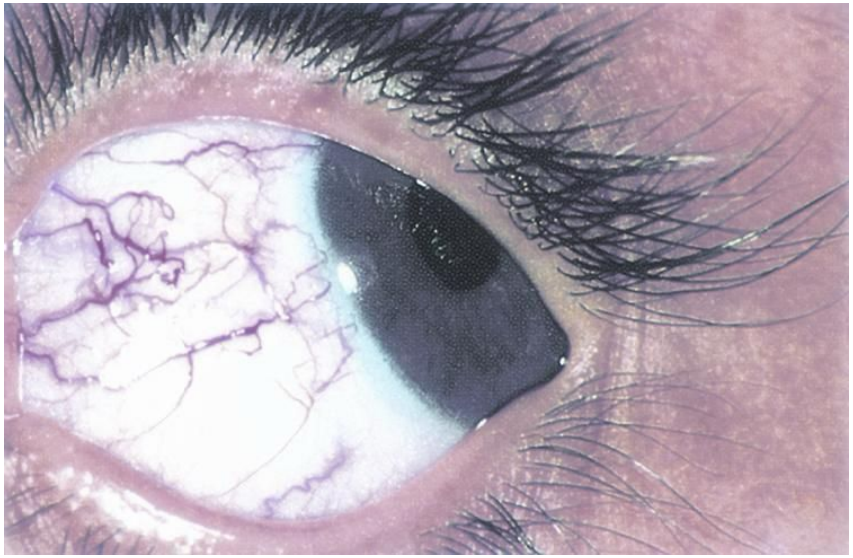


Figure – The hypopigmented patches of tuberous sclerosis may occur anywhere on the body and are often present at birth, as shown in this infant.[22]

Ash-leaf spots >> tuberous sclerosis

This is the eye of an 8-year-old boy. It is anticipated that he may have:

a) elevated immunoglobulin
b) reduced alpha fetoprotein
c) chromosomes breakage
a) tall stature
e) All of the above



Answer :c)
AT patients are prone to have:
a) an immune deficiency
(Reduced IgA, IgG, IgE levels, and thymus hypoplasia)
b) cerebellar ataxia
c) chromosomal breakage
d) short stature
e) elevated alpha fetoprotein.
f) Oculocutaneous telangiectasia.

A 30 year-old man has proportionate short stature. He has a newborn son.
Genetic testing: Pathogenic mutation identified in the SHOX gene (located in a pseudoautosomal region)
What is the risk that the son carries the mutation ?
a. <1%
b. 10%
c. 25%
d. 50%
e. 100%

Answer: d)

Which of the following procedures can be used to identify Down Syndrome pre-natally?

a)Amniocentesis

b) Amnioprolaxis

c) Amniophalaxi

d) Amniocalesis

e) NIPT (noninvasive prenatal testing)

You need to know everything related to Down syndrome including recent advances.

Answer: e)NIPT noninvasive prenatal testing

NIPT stands for noninvasive prenatal testing. It’s a screening test offered on maternal blood to see if the fetus is at risk for having a chromosomal disorder like Down syndrome (trisomy 21), trisomy 18 (Edwards syndrome) and trisomy 13 (Patau syndrome). The test can also determine the sex of the fetus.

The following condition appears with pancreatic insufficiency with fatty replacement, anemia, thrombocytopenia, and metaphyseal dysostosis:

a) Kostmann syndrome
b) Chediak-Higashi syndrome
c) Hyper IgM syndrome
d) Cartilage-hair hypoplasia
e) Shwachman-Diamond syndrome

Answer: e) Shwachman-Diamond syndrome

Beckwith-Wiedemann syndrome is associated with the following condition:

a) Neuroblastoma
b) Wilms tumor
c) Retinoblastoma
d) Ewing sarcoma
e) Rhabdomyosarcoma

Answer: b) Beckwith-Wiedemann syndrome is associated with Wilms tumor and hepatoblastomas. This risk persists until the age of 8 years. 3 monthly abdominal US, and alpha fetoprotein tests are done for early detection.

Which of the following is an example of a Specific Learning Disability?

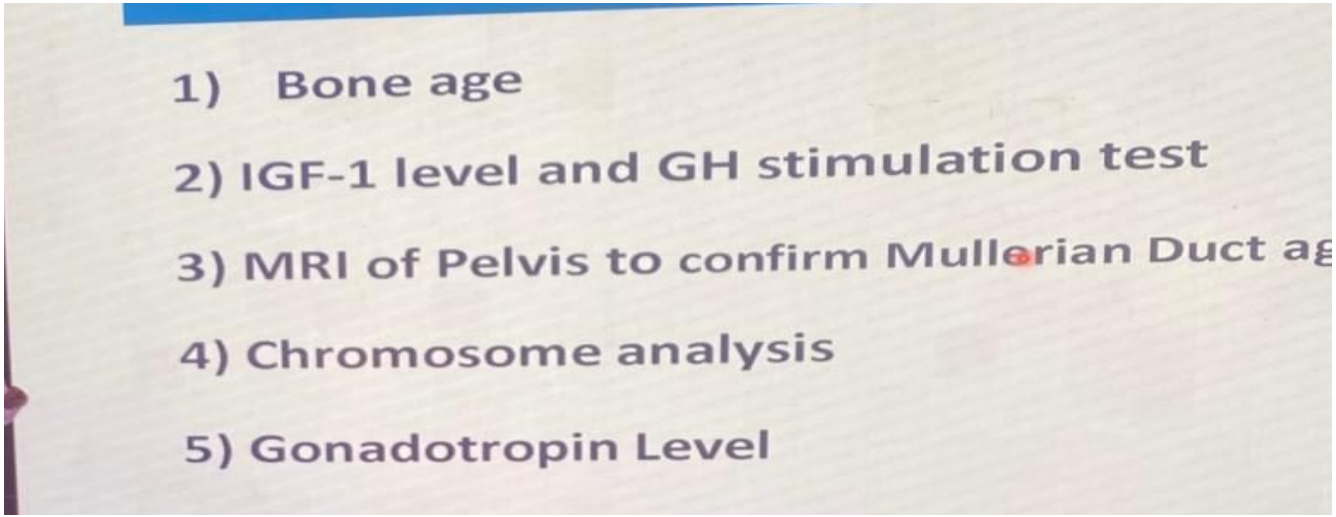
a) Mental Retardation
b) Dyslexia
c) ADHD
d) Autistic spectrum disorders
e) low IQ

Answer: b)
Dyslexia:
A persistent, chronic condition in which reading ability lags behind that of non-impaired individuals for the course of most of their lifetime.

When you answer MCQs need to prioritize your answer, especially when it seems that there are more than one correct answer

We were at an endocrinology meeting for consultant endocrinologists. The speaker asked about what investigation you will order.
Only the speaker gave the correct answer.

A13 years old girl with delayed puberty. She has features of Turner syndrome.
What will be your next step ?



Answer: e) gonadotropin levels

Which is a quick test and available at primary care centers

The following syndrome is due to deletion of paternally derived chromosome 15:

a) Angelman syndrome
b) Down syndrome
c) Prader-Willi syndrome
d) Turner syndrome
e) Noonan syndrome

Answer: c) PWS
Check the previous MCQ

All of the following are manifestations of septo-optic dysplasia EXCEPT :

a) Nystagmus

b) Visual impairments

c) Optic nerve dysplasia

d) Large anterior pituitary gland

e) Incomplete development of septum pellucidum

Answer: d) they usually have hypoplastic anterior pituitary gland

All of the following conditions cause fetal overgrowth except:

a) Sotos syndrome
b) Weaver syndrome
c) Maternal diabetes mellitus
d) SHOX deficiency syndrome
e) Beckwith-Wiedemann syndrome

Answer: d) SHOX deficiency syndrome . Answers (a), (b), and (e) also cause fetal and childhood overgrowth.

All of the following features are present in patients with CATCH 22 syndrome except:

a) Cardiac
b) Abnormal facies
c) Thymic hypoplasia
d) Hypocalcemia
e) Cleft lip

Answer: e) Cleft palate is included in CATCH 22 syndrome (not the cleft lip).

CATCH22 (Cardiac Abnormality/abnormal facies, T cell deficit due to thymic hypoplasia, Cleft palate, Hypocalcemia due to hypoparathyroidism resulting from 22q11 deletion)

Other names for CATCH syndrome:

- DiGeorge syndrome
- Shprintzen, or velocardiofacial syndrome .
- Conotruncal anomaly face syndrome
- Takao syndrome

Every exam you must have one question about 22q deletion syndrome

Genetic syndromes are often associated
with specific cardiac defects.
All these associations of maternal factors and congenital heart disease are correct EXCEPT :

a) Ethanol-ASD, VSD, fetal alcohol syndrome (FAS)
b) Antiseizure medications-PS, AS, TOF
c) Retinoic acid-transposition
d) Diabetes- cardiac arrhythmias
e) Lupus-complete heart block

Answer: d) material diabetes causes hypertrophic cardiomyopathy.

What are the key characteristics of IDM?
IDM=infant of Diabetic mother

A pregnant mother took valproic acid in the early first trimester. She was not sure about her pregnancy at that time. She is worried. Most likely complication:

a) VSD
b) Limb defects
c) Spina bifida
d) Hydrops fetalis
e) Hypoplastic nose

Answer: c) spina bifida

A 20-week-old female fetus was aborted. Physical examination reveals cystic hygroma.
Most likely diagnosis:

a)Turner syndrome
b)Down syndrome
c)Noonan syndrome
d)Trisomy 18
e)Trisomy 16.

a)Turner syndrome.

80% of Down syndrome, and 99% of Turner syndrome are aborted

The true statements about pyloric stenosis:
a) More common in first-born female children.
b) Incidence of pyloric stenosis is 20% if the father has pyloric stenosis.
c) Usually presents with bilious vomiting.
d) Hypochloremic metabolic alkalosis is present.
e) Ultrasonographic findings are not conclusive

d) hypochloremic
metabolic alkalosis is present

Mode of inheritance in ataxia telangiectasia:

a) Autosomal recessive
b) Autosomal dominant
c) X-linked recessive
d) X-linked dominant
e) Multifactorial

Answer: a) Autosomal recessive

Females occasionally have symptoms of X-linked recessive diseases such as Duchenne muscular dystrophy. The most common explanation is:
b) Non-random X-inactivation (lyonization).
c) A female who has 2 parents with the defect on their X chromosomes.
d) X-autosome balanced translocation that disrupts the X-chromosome locus.
e) Turner syndrome (45, X).
f) 46, XY female karyotype.

Answer: a)Non-random X-inactivation (lyonization).
The other options are options are possible, yet they are not as common as the non-random X-inactivation (lyonization) which is a naturally occurring phenomenon that keeps a balance in the gene dosage between males and females.

A man with Klinefelter syndrome will have all of the following EXCEPT:

a)A karyotype of 47, XXY

b)An increased incidence of lens subluxation

c)Infertility, and small testicles

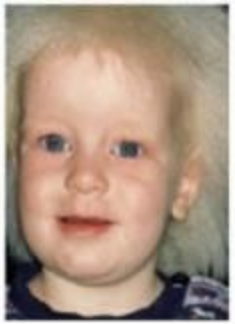
d)An increased incidence of breast cancer

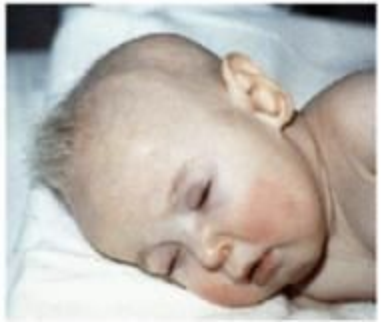
e)The most common type of chromosomal abnormalities in male 1:500

ANSWER: b) An increased incidence of lens subluxa
tion.
Don’t mix it with homocystinuria. Both are tall and
subnormal

A 3-year-old boy presents at one month of age with profound truncal hypotonia. He has brittle hair, sagging, and pudgy cheeks. CT brain showed intracranial hemorrhage. He is most likely to have:

a) Normal development
b) abnormal electrolytes
c) Low levels of copper
d) low levels of zinc
e) Normal life expectancy

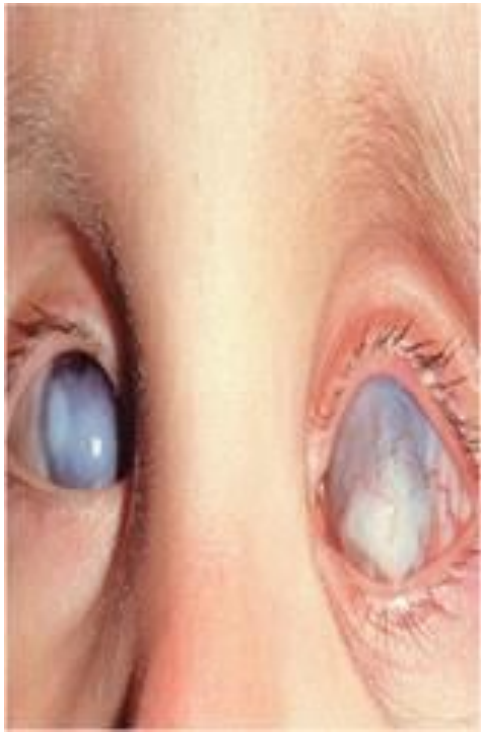




Answer: c) low level of copper and ceruloplasmin.
He has Menkes syndrome which is an X-linked disease.

This is a 3 year old boy with bilateral cataract. He is mentally retarded and has renal tubular acidosis.
He is most likely to have :

a) galactosemia
b) Congenital Rubella syndrome
c) Lowe syndrome
d) Fanconi syndrome.
e) An autosomal recessive disorder.



Answer : c) Lowe syndrome .
An X linked disorder.

Don’t mix them as both are X linked

MENKES DISEASE.

www.openmed.co.in

- A.K.A. **Trichopoliodystrophy**
- Disorder of **transmembrane copper transport**
- **X-linked** recessive (Xq13.3)
- **ATP7A gene** codes for MNK protein
- Diffusely **abnormal White Matter.**
- **Lactate** on MR Spectroscopy.
- **Rapid brain atrophy** predisposing to subdural hematomas
- Sparse and **Kinky Hair**.
- **Low Serum Copper** and Ceruloplasmin
- Truncal **Hypotonia**

Causes of early closure of the anterior fontanelle include all of the following EXCEPT:

a)Craniosynostosis

b) Hyperthyroidism

c) Hypophosphatasia

d)Hyperparathyroidism

e) Hypothyroidism

Answer: e) Hypothyroidism causes a wide anterior fontanel.

You are following a 10-year-old girl with autosomal recessive oculocutaneous albinism. Her affected brother is going to marry an unrelated girl who also has albinism. The parents want to know the risk for their son to have an affected child:

a) If both parents are affected, their recurrent risk is 100%
b) If both parents are affected, their recurrent risk is 50%
c) If both parents are affected, their recurrent risk is 75%
d) If both parents are affected, their recurrent risk is 25%
e) If both parents are affected, their recurrent risk is either zero or 100%

Answer:e) the RR is either zero or 100%

Causes of Fanconi Syndrome are EXCPT :

a) Cystinuria
b) Cystinosis
c) Wilson disease
d) Lowe Syndrome
e) Galactosemia

Answer : c) cystinuria
It doesn’t cause Fanconi syndrome which
is a syndrome of inadequate reabsorption in the proximal renal tubules of the kidney. The syndrome can be caused by various underlying congenital or acquired diseases, by toxicity
(for example, from toxic heavy metals), or by adverse drug reactions. It results in various small molecules of metabolismbeing passed into the urineinstead of being reabsorbedfrom the tubular fluid (for example, glucose, amino acids, uric acid, phosphate, and bicarbonate).

Pierre Ropin sequence

Which of the following statements about SMA type 1 is accurate?

a) Males are affected more often than females.

b)Has an XL type of inheritance

c)Extraocular muscle weakness and facial weakness are prominent signs.

d) Cerebral involvement is common.

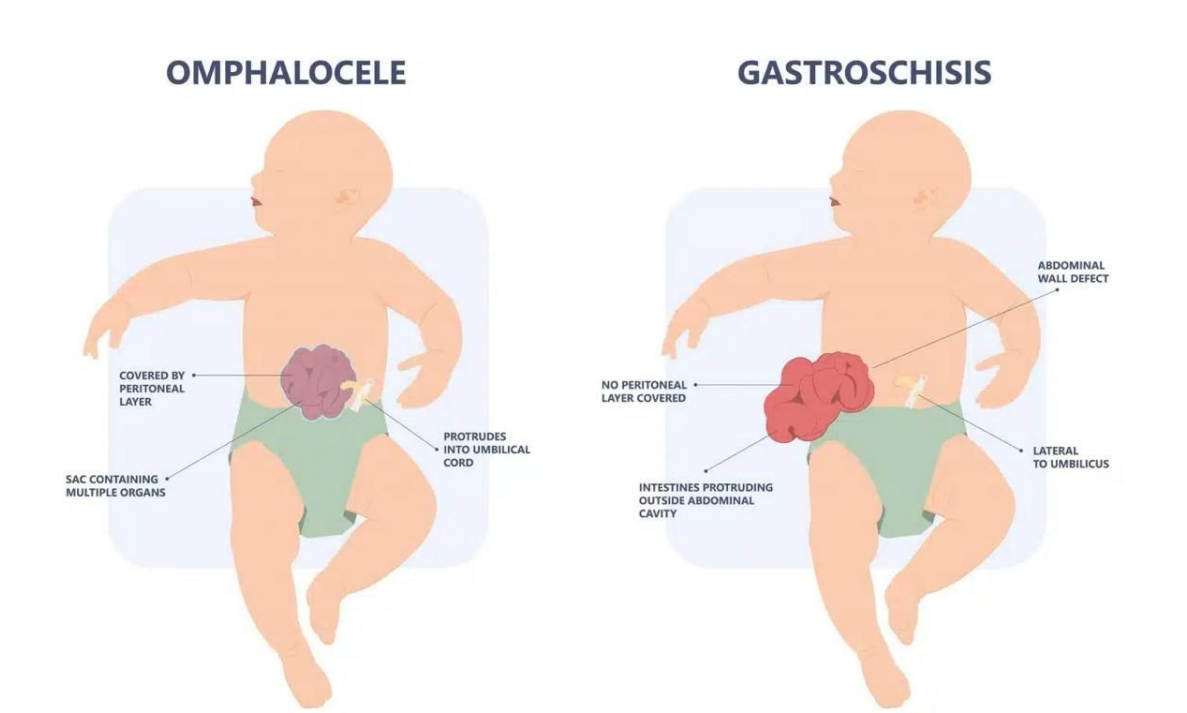
e) Gene therapy is available

Answer: e) Gene therapy is available

You are doing round on a baby with Beckwith-Wiedemann syndrome who has omphalocele; you inform the residents:

a) In gastroschisis, the opening is near the umbilicus, but not directly over it.
b) In omphalocele, the intestines are not covered by a thin sac.
c) In gastroschisis, there is a higher incidence of malformation.
d) In omphalocele, there is a lower incidence of malformation.

Answer:a) in gastroschisis, the opening is near the center and to the right most of the time.



Which of the following statements about the workup for SMA type 1 is TRUE?

a)The creatine kinase level is invariably elevated in SMA type 1

b)Prenatal genetic testing is not yet commercially available

c)Homozygous SMN1 gene deletion is sensitive but not specific for the diagnosis of SMA type 1

d)ECGs are normal in most patients with SMA type 1

Answer: d) no cardiac involvement

Ck is not elevated.
Can be diagnosed antenatally
Homozygous SMN1 gene deletion is 95% sensitive and nearly 100% specific for the diagnosis of SMA.

You need to learn SMA by heart . It is the most common autosomal recessive neurological disorder.

The Ehlers-Danlos syndromes (EDS) are characterized by:
a) being hereditary conditions
b) cerebral involvement
c) joint stiffness
d) skin hyperextensibility, but
no tissue fragility.

Answer: a) most of the 13 types are dominantly inherited

The Ehlers-Danlos syndromes (EDS) are characterized by:
a) being hereditary conditions
b) cerebral involvement
c) joint stiffness
d) skin hyperextensibility, but
no tissue fragility.

Omphalocele has a high incidence of associated syndromes such as:

a) Potter syndrome
b) Fragile X syndrome
c) Trisomy 13, 18, 21
d) Cornelia de Lange syndrome

Answer: c)
Omphalocele has high incidence of associated chromosomal anomalies and syndromes such as:

* Trisomy 13, 18, 21
* Turner syndrome
* Klinefelter syndrome
* Triploidy
* Beckwith-Wiedemann syndrome
* Pentology of Cantrell
* OEIS complex.

The OEIS complex comprises a combination of defects including omphalocele, exstrophy of the cloaca, imperforate anus, and spinal defects. It may represent the most severe manifestation of a spectrum of birth defects, the exstrophy-epispadias sequence

A 7-year-old girl looks dysmorphic with a long tubular nose and narrow palpebral fissures. She is subnormal. As an infant, she had hypocalcemia. She had a history of cleft palate repair. The other features include:
A/autosomal recessive inheritance
B/low immunoglobulins
C/chromosome study will diagnose the disease
D/if she marries, she will have a 50% risk of passing the disease to her offspring

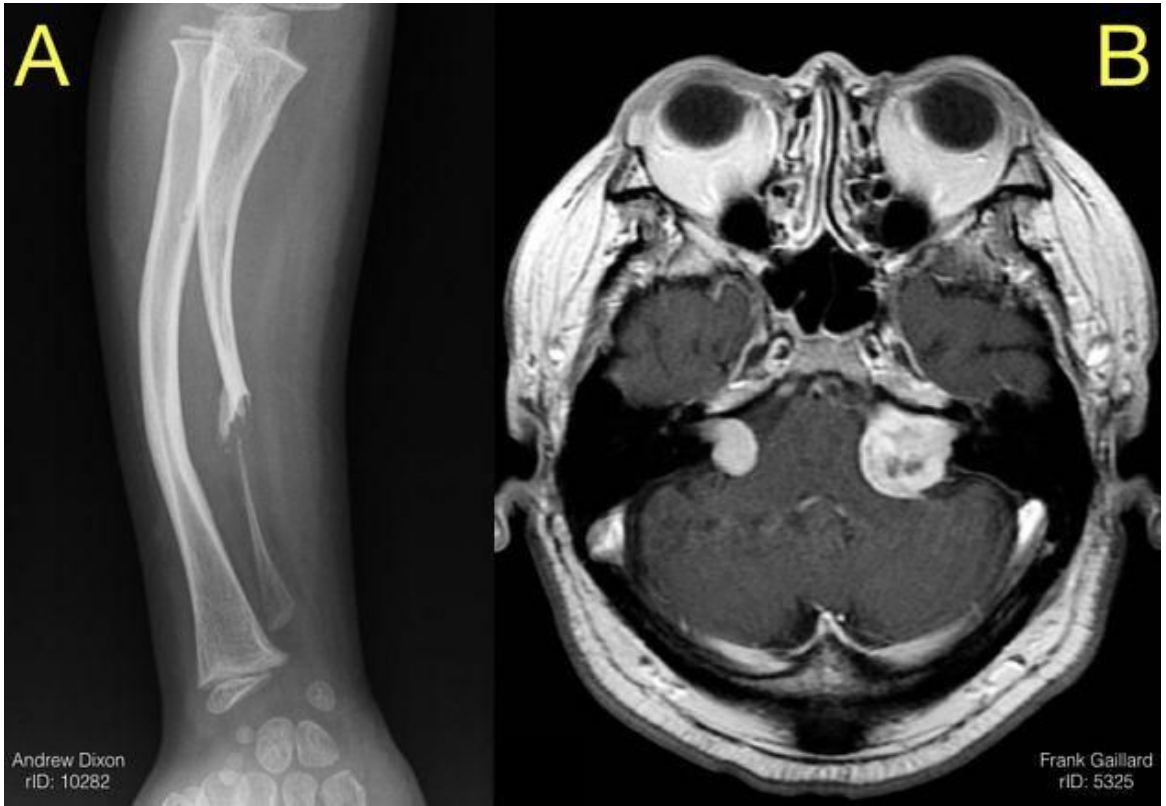
Which patient has neurofibromatosis type 1?

a) patient A

b) patient

c) Neither

d) Both



Answer:a)
Ulnar pseudoarthrosis (patient A) is seen almost exclusively in the setting of neurofibromatosis type 1. Bilateral acoustic schwannomas (patient B) are a characteristic feature of neurofibromatosis type 2 rather than type 1.

Pseudoarthrosis may appear in fibula, radius or ulna but are extremely rare. Irregular eccentric bone cysts in long bones that are commonly diagnosed after a pathologic fracture, must be differentiated for NF. Malignant transformation of neurofibromas must be considered when there is rapid progression of the lesion.

A 7-year-old girl looks dysmorphic with a long tubular nose and narrow palpebral fissures. She is subnormal. As an infant, she had hypocalcemia. She had a history of cleft palate repair.

What is this syndrome?

Answer is: Digeorge syndrome.

They have normal immunoglobulins, but have thymus hyperplasia of variable degree.
As we mentioned before any parents carrying micro deletion will have 50% of passing it to their kids

Fanconi syndrome can be hereditary or acquired. Hereditary Fanconi syndrome usually accompanies another genetic disorder. Of these accompanying disorders, which of the following is most common?

A/ Cystinosis

B/ Fructose intolerance

C/ Galactosemia

Answer: A: Cystinosis. This genetic disorder usually accompanies hereditary Fanconi syndrome. Choices B, C, and D: These disorders may also accompany Fanconi syndrome, but they are less common than cystinosis.

Apert syndrome is an:

A/Autosomal recessive genetic disease
B/Spontaneous mutation in the FGFR2 gene
C/Autosomal dominant genetic disease
D/a and b
E/b and c

Answer: e) FGFR2 spontaneous mutations that increase with increased paternal age. The reason behind it is the greater number of germ-cell divisions in males compared with females contributes to the higher mutation frequency in males and dominant inheritance.

It’s very common to have in written and OSCE (Observed Structured Clinical Examination)

Which of the following are symptoms of Apert syndrome?

a) Cranial stenosis, heart malformation, limb shortening, obstructive sleep apnea
b) Obstructive sleep apnea, hearing loss, limb shortening, vision problems
c) Heart malformation, vision problems, hearing problems, obstructive sleep apnea
d) Hearing loss, cranial stenosis, limb shortening, syndactyly.

Answer is: D.
The other features are present in Apert syndrome, but d) includes the main features.

What teratogenic agents that cause microcephaly and heart defects?

a) maternal diabetes
b) smoking
c) Rubella and alcohol
d) Cocaine

c) Rubella and alcohol.

Another teratogen is phenylalanine in PKU. Mothers who have PKU will give birth to children with microcephaly and CHD, but they themselves are not affected by PKU.

The table above displays Vitamin A, which is known to induce retinoid empathy syndrome. A recent case involved a mother who was prescribed Isotretinoin capsules (Roaccutane) for acne.

Proven Human Teratogens:

Drug	Abnormality
Thalidomide	Phocomelia, multiple defects
Anti-neoplastic drugs	Multiple defects, foetal death
Androgens	Virilization, esophageal, cardiac defects
Progestins	Virilization of female foetus
Stilboestrol	Vaginal carcinoma
Tetracyclines	Discoloured teeth, bone defects
Warfarin	Nose, Eye, Hand defects, Growth retardation
Phenytoin	Cleft lip/palate, microcephaly, hypoplastic phalanges

Table 2. Teratogens and adverse effects.

Agent	Example	Structural anomaly
Drugs	Alcohol	Microcephaly, heart defect
	Cocaine	Vascular disruption
	Valproate	mandibular/ear abnormalities
	Vitamin A	Spina bifida
Infection	Rubella	Microcephaly, heart defect
	Toxoplasma	Hydrocephalus
	Varicella	Limb defects
Maternal factors	Diabetes	Heart defects, neural tube defects
	Phenylketonuria	Microcephaly, heart defect

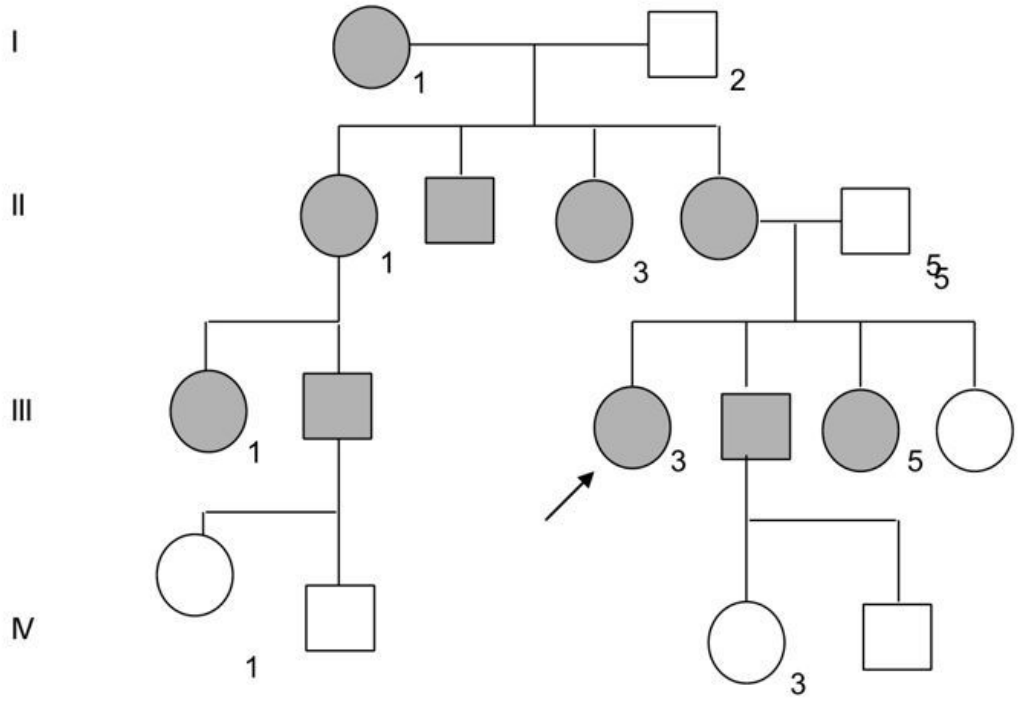
https://qph.cf2.quoracdn.net/main-qimg-44215c659eebec39c9de24b584c3623c.webp

A 5-year-old girl was born with short stature. Her parents are first cousins. She looked dysmorphic with short limbs. She had a good growth hormone response test but very low IGF-1. Her bone age corresponds to 2 years. She most likely has

a) Achondroplasia
b) Turner syndrome
c) Laron syndrome
d) Noonan syndrome

Answer c)

What is the mode of inheritance?



Autosomal dominant inheritance is unlikely in this case due to the absence of the trait in the IV generation.

The issue of nonpenetrance should be considered independently of pedigree analysis. For instance, a child may exhibit polydactyly even if their parents do not possess the trait, while their grandparents do.

The condition is not X-linked recessive since both males and females are affected. While pedigree analysis generally follows common patterns, rare exceptions may occur where females display X-linked recessive disorders.

X-linked dominant inheritance can be ruled out based on the fact that the affected male in the 3rd generation did not pass the trait to his daughters, who would be expected to inherit the affected X chromosome from their affected father.

The correct explanation lies in mitochondrial inheritance.

What is the most likely mode of inheritance for this human disease pedigree above?

AD, it is a dominant condition

An individual with 5 alpha reductase syndrome is:

a) genetically male XY but with female appearance
b) genetically female XX but with male appearance
c) male sex but female gender
d) female sex but male gender

Answer: a)

I brought up this question as it involves a very sensitive counseling issue that pediatricians, endocrinologists and genetic counselors should be aware of.

The 5-alpha-reductase deficiency, an important cause of ambiguous genitalia in children. Initially, the phenotype of children with 5-alpha-reductase deficiency can vary from underdeveloped male genitalia to fully developed female genitalia. This phenotype may change during puberty, at which point male secondary sex characteristics may develop.

Although testosterone is considered a predominant male sex hormone, not all tissues are responsive to testosterone. The 5 alpha enzyme converts testosterone into a more potent form dihydrotestosterone DHT. During male fetal development, testosterone, and DHT have a specific predetermined role in sexual development. Testosterone is the driver for the development of male internal genitalia, including the Wolffian duct, whereas DHT has a role in the genesis of male external genitalia.
At puberty, testosterone is responsible for psychosexual behavior, deepening of the voice, increased muscle mass, and initiating spermatogenesis.
The DHT has a role in the development of the prostate and male hair growth pattern at puberty
Children with a deficiency of 5α-reductase will have decreased production of DHT during fetal development, and this leads to defective external genital development and ambiguous genitalia.

All of the following lysosomal storage diseases have an autosomal recessive mode of inheritance EXCEPT:

a) Gm2 gangliosidosis

b) Hurler disease

c) Fabry disease

d) Metachromatic leukodystrophy

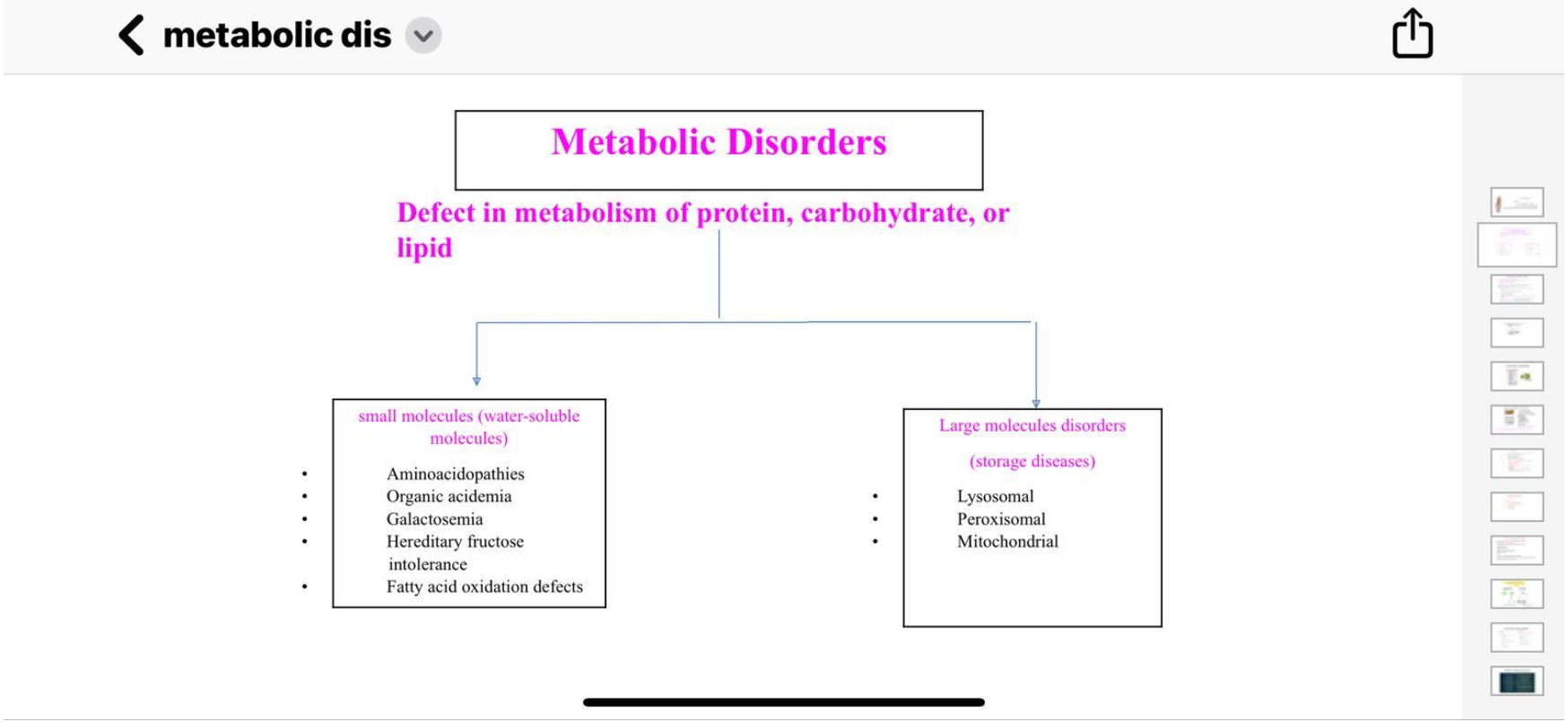
Answer: c)
The leukodystrophy with an XL inheritance is adrenoleukodystrophy.

Adrenoleukodystrophy is:

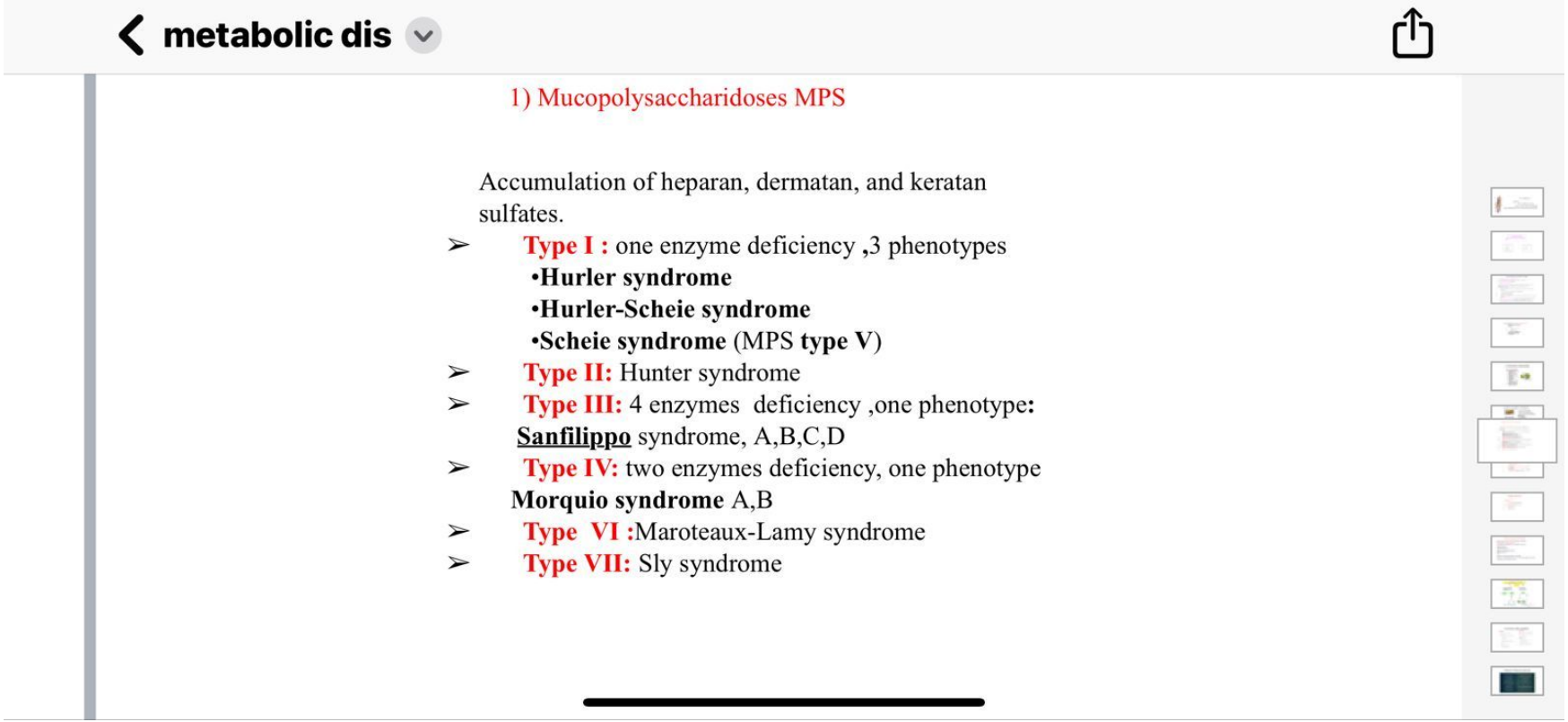
a) A mitochondrial disease
b) A peroxisomal disease
c) A Lysosomal disease
d) An endoplasmic reticulum defect.

Answer: b)
The leukodystrophy ALD with an XL inheritance is adrenoleukodystrophy which is a peroxisomal disorder
you need to know everything about ALD
some cases will present initially to the endocrinologist with adrenal insufficiency.

As a reminder this is the broad classification of metabolic diseases



The most common LSD is the MPS 👇



The peroxisomal disorders are

II) PEROXISOMOPATHIES

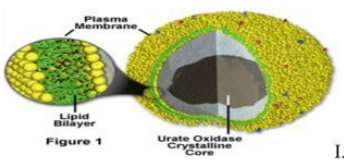


Figure 1

Elevation of very long chain fatty acids,
VLCFA is the hallmark.

CLASSIFICATION:

I. Peroxisomal biogenesis disorders

II. Single enzyme deficiencies.

1) Peroxisome **Biogenesis** Disorders
- Zellweger syndrome (ZS)
- Neonatal Adrenleukodystrophy (NALD)
- Infantile Refsum Disease (IRD)

2) Syndromes of bone dysplasias called rhizomelic chondrodysplasia punctata

3) X-linked Adrenoleukodystrophy (X-ALD)

4) Adult Refsum disease, also called classic Refsum Disease

Dx:

- VLCFA, Plasmalogen, and phytanic acid levels
- Enzyme assays
- PEX genes mutation analysis

The neonatal leukodystrophy has an autosomal recessive mode of inheritance.
Don’t confuse it with ALD.
The most severe type of peroxisomal disorders is Zellweger syndrome.

Macroglossia has been described in all of the following disorders EXCEPT:

a) Hurler syndrome
b) Down syndrome
c) Hypothyroidism
d) Maroteaux-Lamy syndrome
e) Beckwith-Weidemann

Answer : b)

A2-year-old girl presents with hepatosplenomegaly.She had a history of prolonged neonatal jaundice.The psychomotor retardation was evident by 10 months of age. Her eye exam showed cherry red maculae.Other systems were normal. She most likely suffers from:

a) Gaucher disease
b) Wolman disease
c) Neiman Pick disease
d) Metachromatic leukodystrophy
e) Zellweger syndrome

Answer : e) Neiman Pick disease.

Gaucher disease is less common to have cherry red maculae. Wolman disease will have bilateral adrenal calcification. Metachromatic leukodystrophy they usually don’t have organomegaly. Zellweger syndrome will have profound hypotonia, and no cherry red macula.

Be reminded that these are groups of lysosomal storage disorders that resemble each other
They are under group of lipidosis

2)Lipidoses:

excessive storage of fats can cause permanent cellular and tissue damag
in the brain "neurodegenerative course"
liver, spleen "organomegaly"
Bone "skeletal abnormalities
Bone marrow "bone marrow dysfunction"
pulmonary infiltration " respiratory failure

- Gaucher disease &Niemann–Pick disease: types A ,B,and C
- Tay–Sachs disease &Sandhoff disease
- Farber disease& Fabry disease
- GM1-gangliosidosis.
- Krabbe disease& metachromatic leukodystrophy(cause **microcephaly**)
- Canavan disease& Alexander leukodystrophy(cause **macrocephaly**).
- Neuronal ceroid lipofuscinosis, NCL (intractable SZS)
- Wolman disease(adrenal calcification)

3) Oligosaccharidoses

3) Oligosaccharidoses

Glycoproteinoses

- Lysosomal storage diseases affecting glycoproteins
- Defects in lysosomal **function** or **degradation**.

Defects in post-translational modification of lysosomal enzymes

- Mucolipidosis II (I-cell disease)
- Mucolipidosis III (pseudo-Hurler polydystrophy)

Defects in glycoprotein degradation

- Mannosidosis α and β
- Aspartylglucosaminuria
- Fucosidosis
- Sialidosis (mucolipidosis I)

A 3 months old baby boy presents in the 1st week of life with vomiting, abdominal distention, steatorrhea, and hepatosplenomegaly which was progressive since birth. His abdominal radiological studies showed adrenal glands calcification. With biochemical

a) Congenital Adrenal hyperplasia

b)Adrenoleukodystrophy

c) Wolman Disease

d) neonatal adrenal leukodystrophy

Answer: c) Wolman Disease.

Adrenoleukodystrophy is an XL disease (XALD) disease, a progressive disease starting by 6 years of age with occipital leukodystrophy.
Neonatal leukodystrophy (NALD) has an autosomal recessive mode of inheritance characterized by hypotonia, leukodystrophy, and vision and sensorineural hearing deficiencies.

Wolman Disease is a lysosomal storage disease while XALD and NALD are peroxisomal diseases.

A2-yr-old baby girl presents with progressive splenomegaly, bone pain, and pathological fracture. She has bruises and bleeding secondary to thrombocytopenia. Her X-ray showed generalized cystic lesions.Her cousin died of a similar disorder.She most likely

a) Granulocytic leukemia
b) β-Thalassemia
c) Gaucher disease
d) Wiskott-Aldrich syndrome.

Answer: Gaucher disease which has a similar presentation like leukemia. Presence of cystic lesions, and family history make GD more likely.

What is the mode of inheritance of Wiskott Aldrich syndrome?

X-linked recessive

Which disorder among the following does not show cherry red macula:

a) Niemann-Picks disease

b) Wolman disease

c) Tay- sachs disease

d) Sandhoff disease

Answer: b) Wolman disease.

All lysosomal storage disorders involve the CNS without organomegaly except for:
a) Krabbe disease
b) Sanfilippo syndrome
c) metachromatic leukodystrophy
d) Sandhoff disease.

Answer d) Sandhoff disease which is similar to Tay-Sachs disease but the latter does not involve organomegaly.

Kindly be reminded:

Sanfilippo syndrome is the sole MPS that lacks or seldom presents with organomegaly.

It is Helpful to remember these symptoms in order to be able to interpret questions

Types of lipid storage diseases

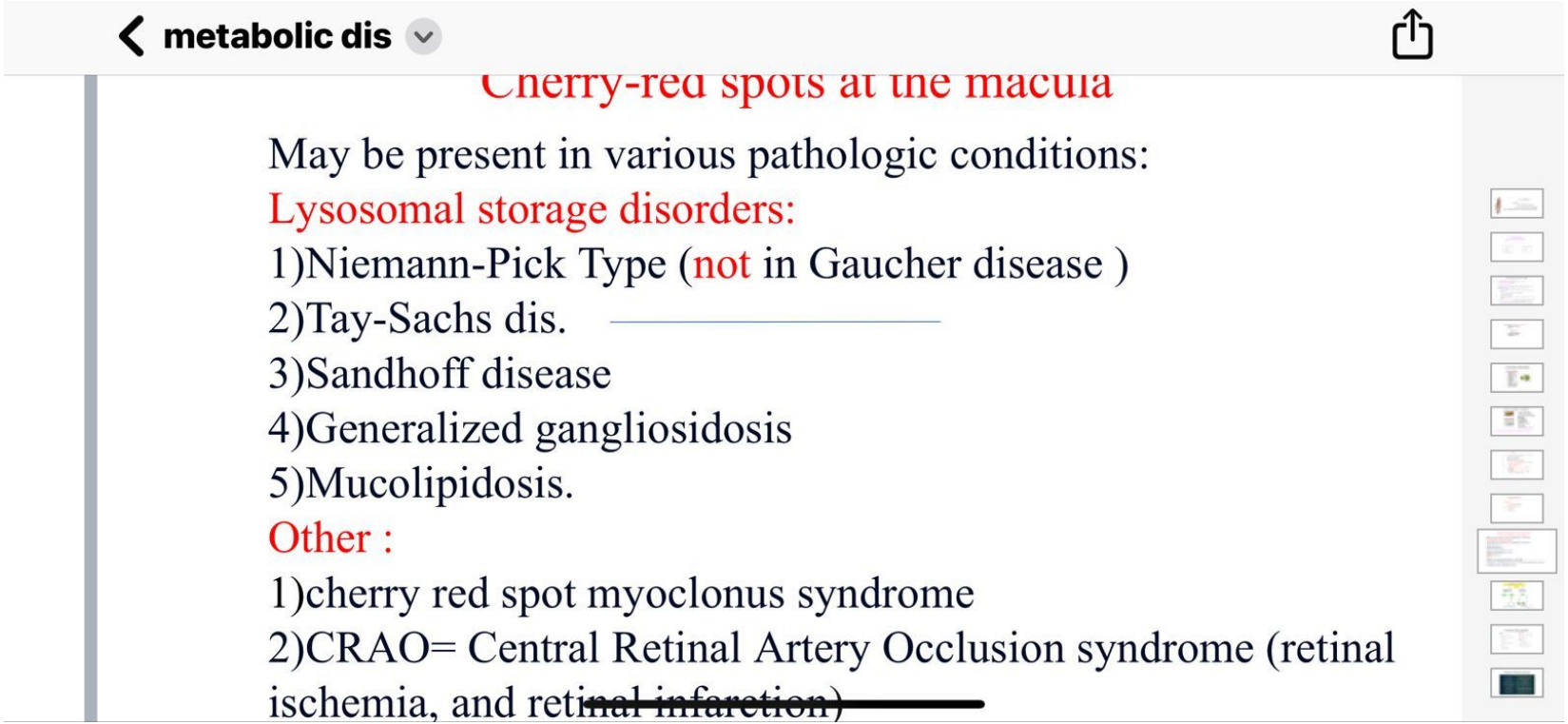
CNS with organomegaly

- Gaucher disease.
- Niemann–Pick disease, types A and B
- Farber disease
- GM1-gangliosidosis
- Sandhoff disease
- Niemann–Pick disease, type C
- Wolman disease

CNS without organomegaly

- Tay–Sachs disease
- Krabbe disease
- Metachromatic leukodystrophy
- Canavan disease
- Alexander leukodystrophy
- Neuronal ceroid lipofuscinosis
- Fabry disease

Retinal ischemia is more frequent cause for having cherry red macula
Again knowing the syndromes that have cherry red macula help you to answer questions



An 8-day-old baby boy presents to the Emergency Department with a history of poor feeding, vomiting, and started to have convulsions. His ammonia was normal, and he had no acidosis. The differential diagnoses include all the following EXCEPT:

a) Non-ketotic hyperglycemia, NKH (glycine encephalopathy)

b) Folinic acid-responsive seizure

c) Propionic acidemia

d) Maple syrup urine disease

An 8-day-old baby boy presents to the Emergency Department with a history of poor feeding, vomiting, and started to have convulsions. His ammonia was normal, and he had no acidosis. The differential diagnoses include all the following EXCEPT:

Select one or more

- a) Non-ketotic hyperglycemia, NKH (glycine encephalopathy) — 0
- b) Folinic acid-responsive seizure — 1
- c) Propionic acidemia — 16
- d) Maple syrup urine disease — 1

11:33 pm

View votes

The Glycogen Storage diseases that principally affect the liver include all the following EXCEPT:

a) Glucose-6-phosphatase (type I)

b) Debrancher enzyme deficiency (type III)

c) Brancher enzyme deficiency (type IV)

d) McArdle disease (type V)

The Glycogen Storage diseases that principally affect the liver include all the following EXCEPT:

Select one or more

- a) Glucose-6-phosphatase (type I) 0
- b) Debrancher enzyme deficiency (type III) 0
- c) Brancher enzyme deficiency (type IV) 1
- d) McArdle disease (type V) 17

11:35 pm

View votes

Patients diagnosed with Glycogen Storage Disease Type I, do NOT typically exhibit the following conditions:

a) Polycystic ovary syndrome
b) Hepatic adenoma
c) Precocious puberty
d) Atherosclerosis
e) Renal disease

Patients diagnosed with Glycogen Storage Disease Type I, do NOT typically exhibit the following conditions:

Select one or more

- a) Polycystic ovary syndrome 1
- b) Hepatic adenoma 0
- c) Precocious puberty 11
- d) Atherosclerosis 0
- e) Renal disease 0

9:26 pm

View votes

Patients suffering from Glycogen Storage disease type I can be effectively treated with the following options EXCEPT:

a) Uncooked starch
b) Glucagon injection
c) Liver transplant
d) Allopurinol

Patients suffering from Glycogen Storage disease type I can be effectively treated with the following options EXCEPT:

Select one or more

- a) Uncooked starch — 0
- b) Glucagon injection — 20
- c) Liver transplant — 0
- d) Allopurinol — 0

9:28 pm

View votes

A 12-year old boy presents with muscle weakness and exercise intolerance. He was noted to have dark urine. His serum lactate was low. Echocardiogram was normal. His creatinine kinase was elevated.The most likely diagnosis is:

a) Limb-Girdle muscular dystrophy
b) Juvenile Pompe disease.
c) McArdle disease
d) Lipid metabolism disorders
e) Spinal Muscular Atrophy type III

Answer :
c) McArdle disease

a) Limb-Girdle muscular dystrophy
b) Juvenile Pompe disease.
d) Lipid metabolism disorders
e) Spinal Muscular Atrophy type III

Explanation:
a) The Limb-Girdle Muscular Dystrophies (LGMD) onset of symptoms is in late childhood, adolescence or even adult life.
Inheritance in LGMD can be
1) Autosomal dominant (LGMD type 1) . There are 7 types from A-G

2) Autosomal recessive (LGMD type 2). There are 12 types
From A-L
Proximal muscle weakness and elevated CK levels.

b) Pompe disease, also known as glycogen storage disease II (GSD2), is the prototypic lysosomal storage disease. In the classic infantile form, cardiomyopathy and muscular hypotonia are the cardinal features; in the juvenile and adult forms, involvement of skeletal muscles dominates the clinical picture. CK is elevated

d) Lipid / Fatty acid oxidation disorders (FAODs) are inborn errors of metabolism due to disruption of either mitochondrial β-oxidation or the fatty acid transport using the carnitine transport pathway. The presentation of a FAOD will depend upon the specific disorder, but common elements may be seen, and ultimately require a similar treatment. Initial presentations of the FAODs in the neonatal period with severe symptoms include cardiomyopathy, while during infancy and childhood liver dysfunction and hypoketotic hypoglycemia are common. Episodic rhabdomyolysis is frequently the initial presentation during or after adolescence with an elevated CK level.
The treatment of all FAOD’s include avoidance of fasting, aggressive treatment during illness, and supplementation of carnitine if their levels are low.

e)Spinal muscular Atrophy SMA type 3 :
Children are usually diagnosed with SMA type 3 between 18 months of age and early adolescence. They are able to stand and walk, but may lose this ability later in life. Life expectancy is not affected. Despite a set pattern of weakness, each person is different in the extent to which they are affected. Intellect is normal and it is often observed that children and adults with SMA are very bright. SMA type 3 is also known as Kugelberg-Welander disease or juvenile spinal muscular atrophy.
CK is not elevated

*A 10month-old baby girl presented to the ER with a seizure.On examination, she was found to have hepatomegaly.Her biochemical workup showed that she had a blood sugar of 0.6 mmol/L and lactic acidosis. She had been admitted frequently for bacterial infections, easy bruising, and epistaxis. The most likely diagnosis is:
a) Granulocytic Leukemia
b) Wiskott-Aldrich syndrome
c) Combined immune deficiency syndrome
d) Glycogen Storage disease.

Answer : d) GSD type 1 b . It’s similar to GSD type 1 a. It is characterized by disturbed glucose homeostasis, neutropenia, and neutrophil dysfunction, is caused by deficiency in a glucose-6-phosphate “transporter “ (G6PT). Type 1 a the G6P enzyme itself is deficient.

It is treated by the Granulocyte colony-stimulating factor GCSF, besides other supportive Rx For GSD type 1

The second wind phenomenon is a hallmark of which myopathy:

a) Mitochondrial myopathy.

b) fatty acids oxidation defect myopathy.

c) McArdle Disease.

d) neuromuscular myopathy.

Answer:
Second wind is a phenomenon where someone suddenly gets a burst of energy after feeling fatigued. It's seen in individuals with McArdle disease typically during 6-10 minutes of light aerobic exercise.

This happens because the body takes time to switch from using muscle glycogen to other energy sources like fatty acids.

Even healthy individuals, especially endurance athletes, can experience something similar after depleting their muscle glycogen during 20-30 minutes of long-distance events like marathons called “runners high

A 4-year-old girl with mucopolysaccharidosis presents with joint laxity, cloudy corneas, and normal mentality. She was found to have weakness of the upper limbs. The most likely type is:

a) Hurler syndrome (type I).
b) Hunter syndrome (type II).
c) Sanfilippo syndrome (type III).
d) Morquio syndrome (type IV).

Answer :d) MPS type IV(Morquio syndrome)

Remember: type 4,6 have normal mentality.

Also , Hurler-Scheie syndrome AND Scheie syndrome are the intermediate form of mucopolysaccharidosis type1

So, they are spectrum

Hurler has the extreme cognitive delay
They have the same enzymes but different mutations that make them milder forms

A 2-month old baby boy presents with bilateral cataract. All of the following metabolic disorders are in differential diagnosis EXCEPT:

a) Galactose-I-phosphate uridyl transferase deficiency,GALT

b) Fructose-1, 6 Biphosphate Aldolase deficiency

c) Galactokinase Deficiency

d) Uridine Diphosphate Galactose Epimerase deficiency.

Answer: b)Fructose 1,6 biophosphate aldolase.
Failure to familiarize oneself with various enzymes cataracts will develop if you find any galactose metabolic defects.
Conversely, fructose is associated with a benign condition resulting from fructokinase deficiency.

***At the airport,a geneticist observed a young girl exhibiting purposeless laughter. Upon speaking with the mother, the physician discovered that the girl experiences seizures and enjoys playing with water. Additionally, the child appears to be smaller than expected for her age and has awide mouth with widely spaced teeth.Based on these observations, the girl most likely has:

a) Cornelia de Lange syndrome
b) Smith-Magenis syndrome
c) Angelman syndrome
d) The information is not enough to recognize the syndrome.

Answer : c) Angelman syndrome.
I observed a 6-month-old baby whose mother reported that she displays inappropriate laughter without any apparent stimulation.
Regrettably, inquiries regarding uncommon scenarios were commonly posed on the Saudi board

Abnormal hair is found in all of the following disorders EXCEPT:

a) Prader-Willi syndrome

b) Chediak-Higashi syndrome

c) Glycogen storage disease type-1

d) Hermansky-Pudlak syndrome.

Answer : c) GSD type 1.

Making even one error in PWS is not permissible😀.

The Prader-Willi syndrome (PWS) most frequently results from paternal deletions of 15q11-q13 or maternal uniparental disomy (UPD) of chromosome 15 Individuals with PWS typically exhibit infantile hypotonia, early childhood obesity, short stature, small hands and feet, hypogonadism, mental deficiency, and characteristic facial abnormalities

In addition, about half of PWS patients exhibit mild to moderate hypopigmentation in comparison to unaffected relatives. Hypopigmentation is also common in Angelman syndrome (AS) which results from maternal deletions of 15q11-q13 or paternal UPD of chromosome 15 and has a clinical phenotype quite different from PWS.

Some patients with PWS and AS have manifested oculocutaneous albinism.

These observations led to the suggestion that a gene involved in melanin pigmentation is located in proximal 15q, subsequently mapped a gene for tyrosinase-positive oculocutaneous albinism (OCA2) to chromosome segment 15q11.2-ql2.

OCA2 results from either deletion or point mutation of the Pgene located in this region.

Other disorders have hypopigmentation/ partial albinism eg the Chediak Higashi syndrome(immune deficiency with partial albinism) . Hermansky- Pudlak syndrome has bleeding tendencies and hair hypopigmentation

A 1-year-old boy presents with coarse features and hepatosplenomegaly. Eye exam shows corneal cloudiness.The parents are consanguineous, and the family lost 2 daughters with a similar presentation. All of the following differential diagnoses are possible EXCEPT:

a) Hurler syndrome
b) Hurler-Scheie syndrome
c) Hunter syndrome
d) Maroteaux-Lamy

The risk for this family to have a second afflicted child is:

a) 1/100,000

b) 1/1,000

c) 1/100

d) 1/4

A newborn baby presents with hypoglycemia on the first day of life. He requires > 12 mg/kg/min. He has no acidosis or ketosis, and has normal ammonia, and hepatic function. The most likely cause for his presentation:

a) Fructose 1,6 diphosphatase deficiency
b) Galactosemia
c) Hyperinsulinism
d) Fatty acid oxidation defect.

In homocystinuria all the following statements are correct EXCEPT:

a) It is inherited as an autosomal recessive disorder.

b) Patients are prone to thromboembolic episodes.

c) Treatment includes high intake of methionine.

d) Vit B6 used in high doses may cause dramatic improvement.

Which syndrome is this

William-Beuren syndrome.

A full-term 4-day-old boy born at home presents to the ER. Per mom, the patient “looks yellow” and is having difficulty with feeding. The mother states that the patient is increasingly sleepy with poor sucking. The patient has been having loose and bloody diarrhea. He has had four episodes of vomiting and overall is acting lethargic. He was found to be febrile. His serum glucose was 2 mmol/l, has elevated liver enzymes, an elevated PT to 51.3, and an INR of 5.5. He had unconjugated hyperbilirubinemia that became conjugated. On examination, he has bilateral cataracts and hepatomegaly. Which of the following enzymes is most likely deficient

a) UDP Glucoronyl Transferase
b) Aldolase B
c) Galactose 1 Uridyl Transferase
d) Galactokinase.

Answer : c) the newborn has galactosemia .

GALT is the enzyme deficient in galactosemia . You need to remember as it is part of the newborn screening tests .

**A 2-month-old baby presents with sleepiness, then started having frequent apneas, weight gain, and vomiting. On examination, he has marked head lag and hepatomegaly. Echo cardiogram shows dilated cardiomyopathy. He has metabolic acidosis and hyperammonemia. His CK was very elevated. Blood glucose was 2 mmol/l.

He most likely suffers from:

a) Organic acidemia.

b) Fatty acid oxidation defects.

c) Mitochondrial disorder.

d) Pompe disease.

Answer: b) fatty acids oxidation defects.

When you a question with similar answers you need to check every option.
a)Organic acidemia will not have head lag,CMP, nor elevated CK.
c) mitochondrial disease will not have elevated CK
d) Pompe disease will not have high NH_3 or metabolic acidosis

A 14 years old boy with rapidly advancing deformity has cloudy corneas and normal intelligence. He has restricted joints. He is most likely suffering from:

a) Mucopolysaccharidosis type II.
b) Mucopolysaccharidosis type III.
c) Mucopolysaccharidosis type IV.
d) Mucopolysaccharidosis type VI.

Answer: d) MPS type 6 (Maroteaux-Lamy syndrome) which is similar to MPS type 4 (Morquis syndrome), but the latter is the only MPS with lax joints

For follow up a child with galactosemia, we usually check which of the following :

a) galactokinase

b) galactose 1 phosphate

c) Galactose 1 uridyl transferase .

d) lactose levels.

It is essential to have a comprehensive understanding of galactosemia. We rely on pediatricians to diligently follow up on these cases.

When considering options a) and c), it is important to note that they refer to enzymes. In the context of metabolic diseases, metabolites are utilized to monitor patient adherence to dietary and medication regimens.

b)Galactose 1 phosphate, also known as G1P, serves as an indicator for a lactose-free diet. Elevated levels of G1P suggest non-compliance.

Enzyme activity remains the same unless a patient undergoes a red blood cell transfusion, in which case the levels will mirror those of the donor's enzyme activity.

You are more familiar with G6PD deficiency, it is necessary to wait for 3 months to obtain results reflecting the patient's own enzyme levels following a blood transfusion.

"Galactitol" is the toxic substance in galactosemia. Its accumulation leads to cataract.

* 1- A 10-yr-old white girl has a history of increasingly severe exercise intolerance and fatigability. The day of admission she had a syncopal event. On examination, she has a systolic ejection click and a loud, narrowly split second heart sound. This is a soft systolic murmur. The chest radiograph demonstrates prominent pulmonary arteries and an enlarged right ventricle. The peripheral pulmonary vascular markings are greatly decreased. The most likely diagnosis is

a) Tetralogy of Fallot
b) Stills murmur
c) Cor pulmonale
d) Primary pulmonary hypertension

Answer is D.

Explanation
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2- A 5-week-old female infant appears with a tremor and irritability. Serum calcium level is 6.4 mg/dL and serum phosphate level is 10.5 mg/dL. Serum SMA 6 results are normal. Chest X-ray reveals normal thymic shadow. Most likely cause:

a) Di George syndrome
b) Cow's milk
c) Infant of diabetic mother
d) Idiopathic hypoparathyroidism

Answer B.

* 3- A child is admitted in a pediatric intensive care unit (PICU) with a shock. A central venous catheter (CVP) is placed. His cardiac output (CO) is increased, systemic vascular resistance (SVR) is decreased, mean arterial pressure (MAP) is normal, wedge pressure (WP) is decreased, and central venous pressure (CVP) is decreased. The most likely diagnosis is:
a) Hypovolemic shock
b) Cardiogenic shock
c) Distributive shock
d) Early septic shock

Answer is D.

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4- A 12-yr-old boy sustains a nail puncture of the right foot through an old sneaker. Two days later, he limps and complains of pain and swelling in that area. The most likely diagnosis is:

a. Tetanus

b. Osteomyelitis

c. Foreign body reaction

d. Ecthyma gangrenosum.

Answer is b.

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5- A 9-yr-old boy presents with fever >39°C for 4 days, myalgias, watery diarrhea, conjunctival infection, diffuse erythroderma, strawberry tongue, blood pressure of 105/45 mm Hg, and moderately elevated hepatic transaminases. The most likely diagnosis is

a) Staphylococcal scalded skin syndrome

b) Kawasaki disease

c) Toxic shock syndrome

d) Stevens-Johnson syndrome

Answer is c.

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* 6- A 13-yr-old adolescent boy presents with unexplained febrile illness. He had travelled to India with his parents 6 mos. ago, and both he and his parents confirm complete adherence to the prescribed malaria prophylaxis regimen. Which of the following is true concerning the need for investigation for malaria as the cause of his illness?

a. No investigation is necessary because prophylaxis was used

b. No investigation is necessary if mefloquine was part of the prophylactic regimen

c. Investigation is necessary only if he has had unexplained fevers since his return

d. Investigation for malaria is necessary.

Answer is D.

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7- Most common complication of ECMO (extra corporeal membrane oxygenation):

a. Stroke

b. Atelactasis

c. Hemolysis

d. Intracerebral bleeding

Answer ? D but not sure 🤔.
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8- A simple anoplasty is performed in the newborn with perianal fistula. The colostomy is not required. The following procedure is indicated 2 weeks after surgery:

a) Barium enema
b) Upper GI follow through
c) Colostomy
d) Anal dilatations

Answer is D.
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9- The MOST common etiology of pulmonary infiltrates with eosinophilia (PIE) is

a) simple pulmonary eosinophilia
b) acute eosinophilic pneumonia
c) allergic bronchopulmonary aspergillosis
d) parasitic Infections.

Answer is D ? 🤔

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* 10- A full-term female newborn was admitted to NICU with severe meconium aspiration. She was intubated in the delivery room and was placed on a mechanical ventilator IMV 40, PIP 20, PEEP 4, FiO2 100%. ABG reveals pH 7.24, PCO2 60, PO2 50, base deficit –15.4. She has both respiratory and metabolic acidosis. The next step in the management:

a) Correct respiratory acidosis before metabolic acidosis
b) Correct metabolic acidosis before respiratory acidosis
c) Correct metabolic acidosis only
d) Start dopamine drip

Answer A.

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11) The initial management of a hemodynamically stable 2-mo-old infant with supraventricular tachycardia should include:

a) Vagal stimulation

b) Cardioversion

c) Defibrillation

d) Digitalization

Answer A

12- The child with polyarticular,JIA often has a more prolonged course of active joint inflammation and requires early and aggressive therapy. Of the following, the predictor that carries the WORST prognosis is:

a) rheumatoid factor (RF) seronegativity

b) absence of rheumatoid nodules

c) small numbers of affected joints

d) hip joint involvement.

Answer D

* 13) A child was brought to the ER after a car accident. There was nobody to give a proper history. The child was cyanotic and unresponsive. He was intubated immediately. The child's oxygen saturation improved to 100%, but no spontaneous respiration was noted. Physical examination revealed hypotension, multiple bruises, abdominal distension, and an obvious femoral fracture. The surgeon suspected splenic rupture, which was confirmed by a CT scan. The family could not be contacted. The next appropriate step in management would be to:
a) Wait for the parents to arrive and give consent prior to surgery.
b) Get consent from the social worker involved in the case.
c) Get consent from a neighbor who was contacted by the social worker.
d) The surgeon should perform the procedure without waiting to obtain consent for the benefit of the

Answer D

14) Most common cause of secondary peritonitis in children:
a) Perforated stomach with ulcer
b) Necrotizing enterocolitis
c) Ruptured bile duct
d) Ruptured appendix

Answer d

15) A full term male infant appears jaundiced during the first 24 hours of life due to ‘AO' incompatibility and Coombs positive results. His serum bilirubin level is 35 mg/dL.

Double-volume exchange transfusion is performed. The most likely morbidity is

a) Seizures

b) Hydrocephalus

c) Spastic quadriplegia

d) Choreoathetotic cerebral palsy

Answer D

A child's hematologic test results reveal a hemoglobin 9 g/dL, hematocrit 27, MCV 57, hemoglobin A 90%, hemoglobin A2 5%, and hemoglobin F 5%. Blood smear reveals poikilocyte, ovalocyte, basophilic stippling, and a few target cells. Most likely diagnosis:

a) Sickle cell disease
b) Thalassemia minor
c) Iron deficiency anemia
d) Thalassemia major

Answer is B.

The earliest prenatal diagnosis of a congenital adrenal hyperplasia:
a) Elevated 17-hydroxy progesterone level in a maternal blood.
b) Elevated 17-hydroxy progesterone level in amniotic fluid.
c) HLA typing and DNA analysis in amniotic fluid cells
d) HLA typing and DNA analysis of chorionic villi biopsy specimen

Answer is D , chorionic villus sampling is the earliest at 10-12 weeks gestation vs amniocentesis 15 weeks, 17 hydroxyprogesteron in amniotic fluid deemed inaccurate due to false low results, no role for maternal blood measurement of 17 OHP.

- A 3-year-old girl appears with a bilateral inguinal hernia. The girl may have an associated condition such as:

a) Ectopic ovary
b) Enlarged lymph nodes
c) Femoral hernia
d) Testicular feminization syndrome

Answer is D

The characteristic late manifestation of congenital syphylis is

a) Jaundice
b) Periosteitis
c) Metaphysitis
d) Interstitial keratitis

Answer is D. Late manifestations are after two years of age , other option related to early manifestations

Osteitis may be a feature of one of the following transplacental infections :
A/cytomegalovirus
B/herpes simplex virus
C/varicella-zoster virus
D/rubella

Answer is D rubella, common finding of Radiolucent bone lesions in the long bone, Its involvement is considered as a type of true osteitis showing areas of radiolucency, cortical destruction and periosteal new bone formation

A newborn infant appears with a cluster of vesicular lesions on the scalp at the time of delivery. He was born by NSVD with Apgar scores of 9 and 9 at 1 and 5 minutes respectively. The rest of the physical examination is unremarkable. The mother has no active genital lesions. The next step in management is:

a) Rupture the vesicle and send for a bacterial culture

b) Rupture the vesicle, send a culture, and begin antibiotics therapy

c) Begin acyclovir therapy after appropriate laboratory testing

d) Admit the infant in NICU and observe the infant. If the infant becomes symptomatic, beign amphote

Correct answer: C. A potential life threatening presentation needs immediate action once suspected.

Which of the following is an effective screening test for T-cell function?

a) Absolute lymphocyte count

b) Flow cytometry for CD4 (helper) and CD8 (cytotoxic) T cells

c) Respiratory burst assay

d) Candida skin test

Answer D , the clue would be a screening for function. Delayed hypersensitivity skin (candida antigen test) test can be useful as a cheap functional test. Lymphocyte count and CD4, CD8 count good as screening but dose not test the function . Advanced functional assay not included in the option I will ask our immunology colleagues what they think and give you a feedback

A -3 year-old boy wants to go to school. The most important finding that indicate that the boy is ready to go to school:

a) Follow all commands
b) Toilet trained
c) Does not like to watch TV
d) Expressive language development

I have to agree with toilet training answer B as most preschool nursery would have that as an entry requirement, expressive language not specific although was stated as the answer by the MCQs author. Following simple command not All command is needed for child safety and other skills like expressive language playing with other kids, following routine will help to get him settled quickly in the preschool setting.

Physical activities should be limited in the following cardiac disease

a) VSD
b) ASD
c) PDA
d) Aortic valve stenosis

Answer is D

The most common brain tumor in pediatric age groups is:

a) Astrocytomas
b) Craniopharyngiomas
c) Ependymomas
d) Medulloblastomoma

Answer is A

* A 2-year-old boy appears with irritability, pruritus, and ataxia. He had Kasai procedure (hepatoportoenterostomy) at 3 months of age. Physical examination reveals hepatosplenomegaly and decreased deep tendon reflexes. Laboratory findings reveal a normal PT, calcium, phosphorus, bilirubin, and SGOT; mildly elevated SGPT; highly elevated alkaline phosphatase. Most likely deficiency:

a) Vitamin A
b) Vitamin D
c) Vitamin E
d) Vitamin k

Answer c

A fetal hemoglobin chain that rapidly decreases in first few months after birth:

a) Beta chain

b) Gamma chain

c) Delta chain

d) Epsilon chain

Answer B

An infant is diagnosed with congenital adrenal hyperplasia. He has a high BP. The most likely enzyme deficiency is:

a) 21-hydroxylase deficiency
b) 11 beta-hydroxylase deficiency
c) 3 beta-hydroxysteroid dehydrogenase deficiency
d) 17 alpha-OH/17, 20-lyas deficiency
e) 17-hydroxylase deficiency

Answer b. The clue is infant and most likely diagnosis, 11 beta-hydroxylass is second most common form of CAH.

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14-year-old girl is diagnosed with Graves disease. The preferred therapy is:

a) Methimazole

b) Propylthiouracil

c) Radioiodine

d) Subtotal thyroidectomy

Answer is a

Prolonged QTc is a sign of poisoning with

A) amiodarone

B) carbamazepine

C) cardiac glycosides

D) tricyclic antidepressants

Answer is D

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* An 11-year-old adolescent boy came to your clinic with a complaint of been collapsed while bathing with hot water after he felt dizzy. Father confirms that the boy was extremely pale when founded. He added that he take few minutes to recover, also he had past history of similar condition one month ago when he was urinating. Of the following, the MOST likely explanation for this condition is
A) long QT syndrome
B) hypertrophic cardiomyopathy
C) neurocardiogenic syncope
D) seizure disorder

Answer is C

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* A previously healthy 1-month-old boy has an episode of sudden choking and gagging that frightens his mother and grandmother. His face briefly turns red. He does spit up occasionally, but such an event has never occurred before. In the ED, he appears well, and a thorough examination is normal. He is admitted for 23 hours. No more spells occur. Recommended routine screening is unremarkable. This event is most likely explained by:

A. Gastroesophageal reflux.
B. Intracranial hemorrhage.
C. Pertussis.
D. Seizure disorder.

Answer is A

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* A 12-month-old boy presents with a 7-month history of a worsening skin rash. The rash is pruritic and involves his neck, anterior and posterior trunk, antecubital and popliteal fossae, and hands and feet. Use of a moisturizer and topical corticosteroid has resulted in some improvement. The remainder of his past medical history is unremarkable. On physical examination, you observe multiple erythematous, lichenified patches and diagnose severe atopic dermatitis.
Of the following, the MOST helpful next step is to:
A. eliminate milk, eggs, soy, and wheat from the diet
B. measure serum immunoglobulins (IgG, IgA, and IgM)
C. perform aeroallergen allergy testing
D. perform food allergy testing

Answer ? D?
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* A 4-year-old girl appears with abdominal pain, nausea, vomiting, and low grade fever for the last 6 hours. The abdominal pain started before the nausea, vomiting, and fever. She denies history of trauma. The physical examination reveals flat abdomen, periumbilical tenderness, and normal bowel sounds. The most likely diagnosis is:

a) Acute gastritis
b) Acute gastroenteritis
c) Hemolytic-uremic syndrome
e) Acute appendicitis

Answer is E appendicitis

Down syndrome
maternal non disjunctions is it same

maternal non miotic ? or mitotic ?

I received this important question ? you need to learn everything about Down syndrome including the NIPT and the triple prenatal test

To answer this question
First and foremost, you should know that mitosis takes place in every cell in our body(somatic cells), however, meiosis takes place within the germ cells to produce the ova and sperms with 23 chromosomes
انقسام اختزالي
1) Trisomy 21
(47chromosomes) accounts for 95% of Down syndrome (DS). 2)
2)4% translocation (Down syndrome with 46 chromosomes, and either parent has 45 chromosomes).
3) 1-2% mosaics (some cells 46 chromosomes/47 chromosomes).
*Most trisomy 21 cases 95% are the result of a maternal meiotic non-disjunction event.
*Paternal non-disjunction of chromosome 21 accounts for
5–10% of all trisomy.
We can do a test to find out whether it’s maternal or paternal; however, we don’t tell the parents about that option unless they request it.

I received a question regarding use of ERT in Gaucher disease.

This is the correct answer: ERT, or Enzyme Replacement Therapy
1)Type 1 Gaucher disease is the most common and typically the only type for which ERT is routinely administered. This treatment helps to replace the deficient enzyme, improving symptoms and reducing complications associated with the disease.
2. Type 2 and Type 3 Gaucher diseases, they often have more severe neurological implications.
If you have further questions about Gaucher disease or related treatments, feel free to ask!.

One of the board MCQ 2024 is:

A Neonate with opisthotonos, seizures, alternating hypertonia and hypotonia. Hypoglycemia, hyperammonemia, metabolic acidosis, low chloride with normal sodium and potassium.

The answer is MSUD

Cont,

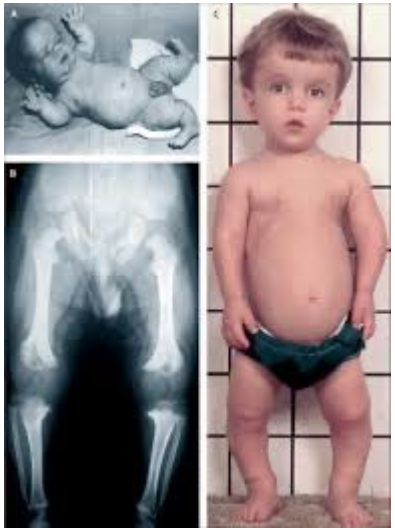
Why isn’t tyrosinemia?
Tyrosinemia is characterized by progressive liver disease and a secondary renal tubular dysfunction leading to hypophosphatemic rickets. Onset varies from infancy to adolescence.
patients present with severe liver failure within weeks after birth, whereas rickets may be the major symptom in chronic tyrosinemia.
Untreated, patients die from cirrhosis or hepatocellular carcinoma at a young age. The screening test is urinary succinylacetone.
If you’re going to have a question on tyrosinemia, cholestatic jaundice is an essential component of the clinical presentation

4 days old presented with history of lethargy , decrease feeding and activity. Lab done and showed :
glucose 30 , ketone -ve (reference was -ve in exam)
elevated lactate, what is the most likely diagnosis?

A. Sepsis
B. Tyrosinemia.
C. Medium chain fatty acid disease. (MCAD)
D. PKU

MCAD is the right answer,
even though the question stem does not indicate that it is MCAD, which is a silent disorder, in contrast to VLCAD. I saw a newborn baby due to positive newborn screening. When I examined his 13-year-old brother, he was also affected.

Achondroplasia:
The most common skeletal dysplasia



Autosomal dominant with 100 %
penetrance(if you have the gene you will show the disease)
- 80% cases new mutations

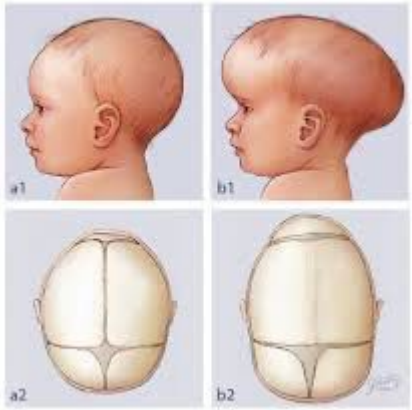
- Advanced Paternal age effect
Complications:
1)Conductive hearing loss and recurrent ear infections
2)Obstructive sleep apnea
3)cervicomedullary compression, spinal stenosis, and hydrocephalus
Rx : Vosoritide is in a class of medications called C type natriuretic peptide (CNP) analogs. It works by increasing cartilage cell growth which results in increased bone growth.

For today , we have a common OSCE case which is microcephaly.
The most common cause of microcephaly with normal cognitive function is familial microcephaly.
The most common causes of pathological microcephaly are
A) congenital infections
such as:

1.Zika virus
2. Rubella
3. Toxoplasmosis

B) Genetic factors:
Either isolated (autosomal recessive) or part of a syndrome.
C) Fetal alcohol syndrome.
Metabolic disorders e.g. PKU , it causes a postnatal microcephaly.
The child will be born with a normal HC.

This is the sagittal craniosynostosis (scaphocephaly), which is the most common type of craniosynostosis.



Metopic synostosis is different from metopic ridge, which is a normal variant. Metopic synostosis can be associated with increased intracranial pressure, developmental delays, or other neurological issues due to restricted brain growth, which are more severe if multiple sutures are prematurely closed.
We need to do a brain CT scan to differentiate between these two entities.

The most common syndrome of mental retardation.
You need to everything about it.
l signs of Down syndrome
screening methods:
1. Ultrasound Findings:
- Nuchal Translucency:Increased thickness of the nuchal fold during the first trimester can be a sign.
- Hypoplastic nasal bone
- Shortened femur
- Heart defects
2. Blood Tests:
- (Quad Screen):
Alpha fetoprotein (AFP)⬇️
Human chorionic gonadatropin (hCG) or free beta hCG⬆️
(A decreased level is associated with T18 and T13.)
Inhibin-A⬆️
(a placental protein)
An increased level of inhibin-A in the maternal blood in the second trimester is associated with T21.
-Estriol (uE3)⬇️
So In down syndrome, maternal blood will show :
#Low AFP and estriol
High hCGH and
inhibin A
3. Non-Invasive Prenatal Testing (NIPT):
- This is a blood test that analyzes “fetal “DNA circulating in the mother’s blood. It is highly sensitive and can provide a more accurate assessment of the risk of Down syndrome, and other trisomies T13, and T18

Types of Down syndrome:
I) Non disjunction
II) translocation
III) Mosaic

I)Trisomy 21 accounts for >95% of Down syndrome (DS) .
Most trisomy 21 cases are the result of a
“ maternal “meiotic non-disjunction event.
Paternal non-disjunction of chromosome 21 accounts for 5–10% of all trisomy 21.
(we can identify the parental origin of extra 21 chromosome, but we don’t mention that in family counseling).

The number of chromosomes in this type of (non disjunction) is 47 XX + 21 (female with DS)
or 47 XY +21(male with DS)
No need to do parental chromosomes.

II) 4% of Down syndrome cases are caused by “Robertsonian translocation” which involves a rearrangement of genetic material between chromosomes. The genetic material from the extra 21 chromosome is what causes the health problems in people with Down syndrome.
In translocation Down syndrome, the extra 21 chromosome may be attached to the 14 chromosome. Or it could be attached to other chromosome numbers like 13, 15, or 22.
Two 21 chromosomes can be attached to each other in some cases which leads to the characteristic features of Down syndrome.

- The number of chromosomes in patients with this type of Down syndrome is 46 XX,der(14; 21)+ 21. That means the long arm of chromosomes 21 translocated to the long arm of 14 in a female Down syndrome.

- Or 46XY, der (14;21) + 21 in a male with Down syndrome
- You must do parental chromosomes which usually show maternal 45 XX , rob (14;21) or paternal 45 XY, rob (14;21)

This type of Down syndrome is inherited.
The risk is higher if the mom is carrier for the translocation 1:10 than if the father is a carrier 1:20

III) Mosaic Down syndrome ; some cells have 47 chromosomes some have normal 46 chromosomes. They usually have milder symptoms .

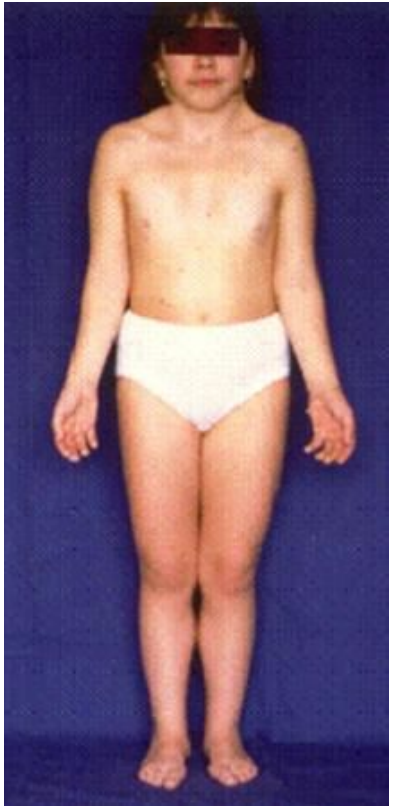
Length increment
1. Infancy (0-1 year): about 25 cm.

2. Toddlerhood (1-3 years): Steady growth; grow 7-10 cm/year .

3. Adolescence (12-18 years): growth spurts lead to 7-10 cm / year

-Birth 50 Cm
-1 year 75 Cm
- 4 years 100 Cm
- Growth spurt

in Turner syndrome, the missing chromosome is typically a result of nondisjunction. It cannot be definitively stated whether the missing chromosome is maternal or paternal.



Syndromes associated with proportionate short stature.
1. Turner Syndrome:

2. Noonan Syndrome(male Turner). It affects both males and females.

3. Prader-Willi
syndrome:It is caused by the loss of function of specific genes on chromosome 15.

4. Russell-Silver Syndrome:

5. Growth Hormone Deficiency OR Laron Syndrome also known as growth hormone insensitivity or growth hormone receptor deficiency(GHRD), is an autosomalrecessive disorder characterized by a lack of insulin-like growth factor 1(IGF-1/somatomedin-C) production in response to growth hormone (GH; hGH; somatotropin).
It is usually caused by inherited growth hormone receptor (GHR) mutations.

6. Down Syndrome.

7.Bardet-Biedl syndrome is an autosomal recessive disorder characterized by retinitis pigmentosa, polydactyly, mental retardation, obesity, renal anomalies, and hypogonadism.

Disproportionate short stature:
1. Skeletal Dysplasias
2. mucopolysaccharidosis

Further note on
Disproportionate short stature:
✅They usually have normal HC that relatively appears microcephalic.

Here are some relevant terminologies and classifications:

1. Spondylo: This prefix refers to the spine.

2. Metaphyseal: Metaphysis is the growing part of long bones.
✅Metaphyseal dysplasia is sometimes confused with nutritional rickets.

3. Epiphyseal: Epiphysis is the end part of a long bone.

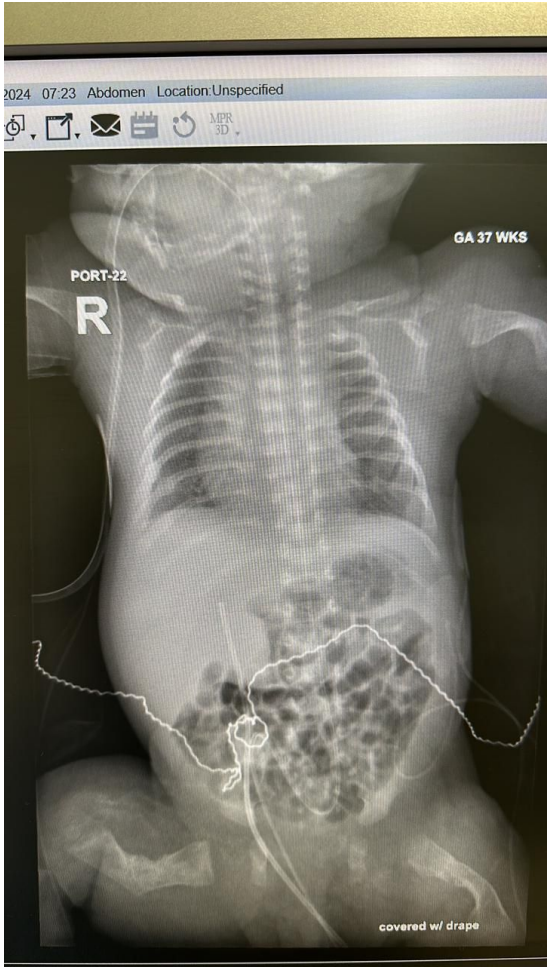
4. Rhizomelic: (Humerus and femur). Conditions like achondroplasia are characterized by rhizomelic shortening.

5. Mesomelic: Short middle segments of the limbs (radius-ulna and tibia-fibula).

6. Acromelic: (hands and feet).

The radiologist used these terms to classify various forms of disproportionate short stature based on which parts of the body are affected

A one day old newborn
What is the defect !?
And the mode of inheritance!?



OI type II
osteogenesis imperfecta (OI)
A lethal disorder of connective tissue .
It is inherited as AR

Deafness is found in 50-90%
usually in the 2nd- 3rd decade of life

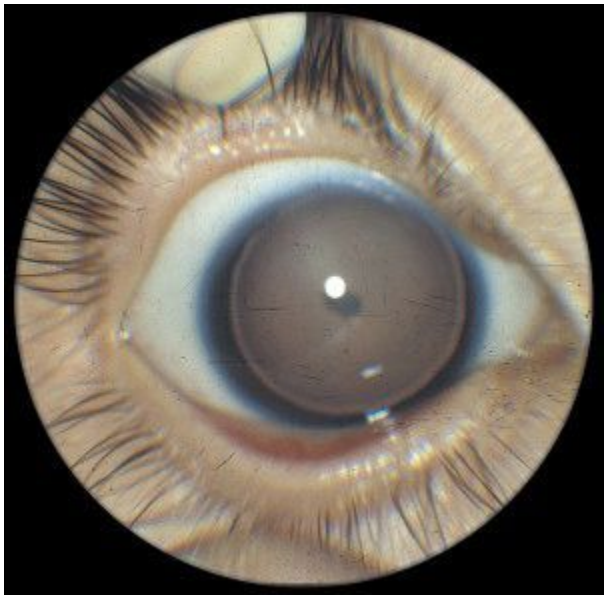
osteogenesis imperfecta (OI) type I is the most common type . It is compatible with life . It is inherited as AD

Advanced paternal age is well documented to be associated with new dominant mutations in :

* achondroplasia,
* Apert syndrome,
* Marfan syndrome

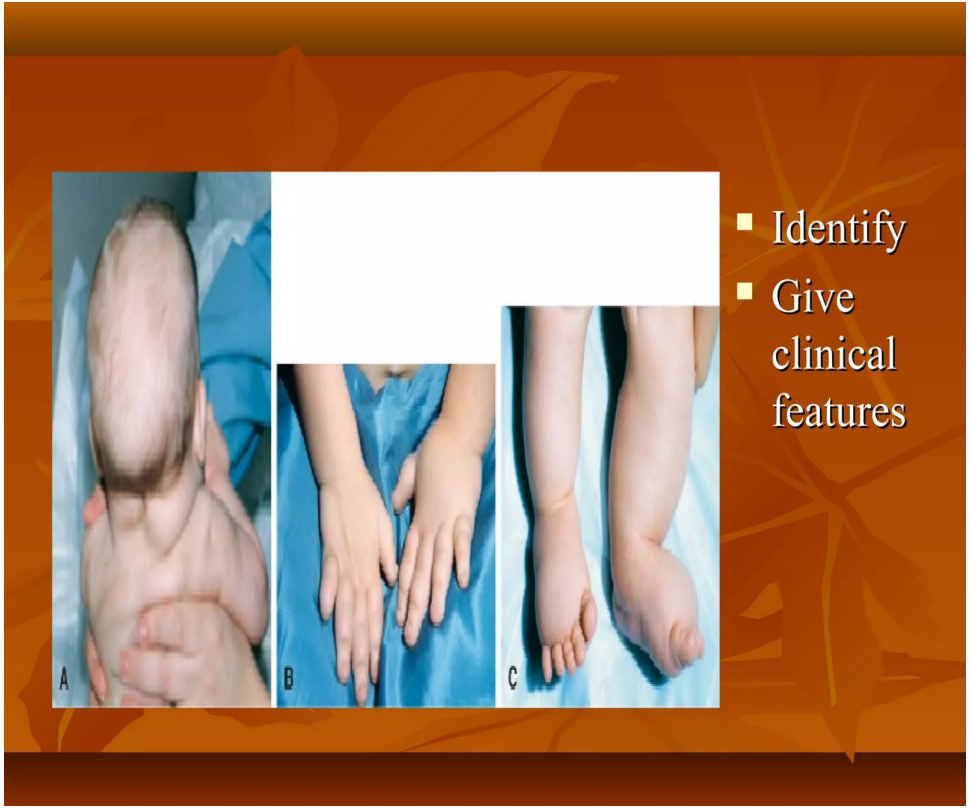
What syndrome is associated with CATCH22?
These are features of DiGeorge/velocardiofacial syndrome:
C) Congenital heart disease

A) Abnormal face
T) Thymic aplasia/hypoplasia
C) Cleft palate(not cleft lip)
H)Hypocalcemia



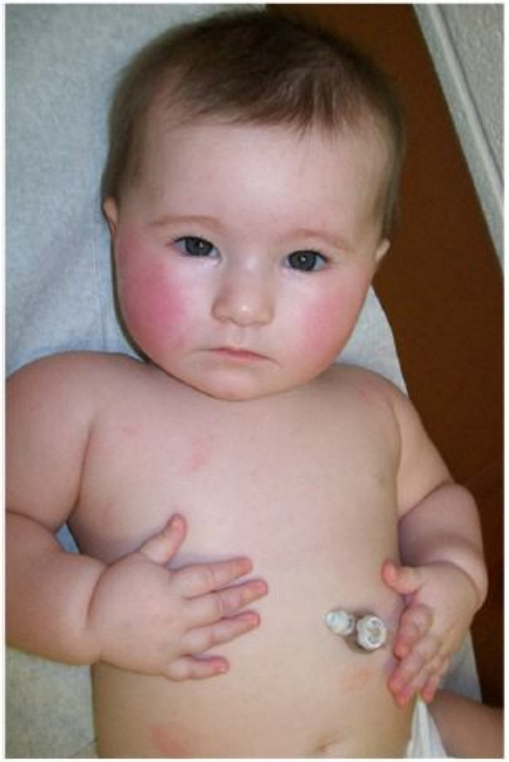
Sporadic aniridia may correlate with WAGR syndrome (Wilm tumor, aniridia, genitourinary anomalies, and mental retardation

Coloboma
CHARGE syndrome is a disorder that affects many areas of the body. CHARGE is an abbreviation for several of the features common in the disorder: coloboma, heart defects, atresia choanae (also known as choanal atresia), growth retardation, genital abnormalities, and ear abnormalities

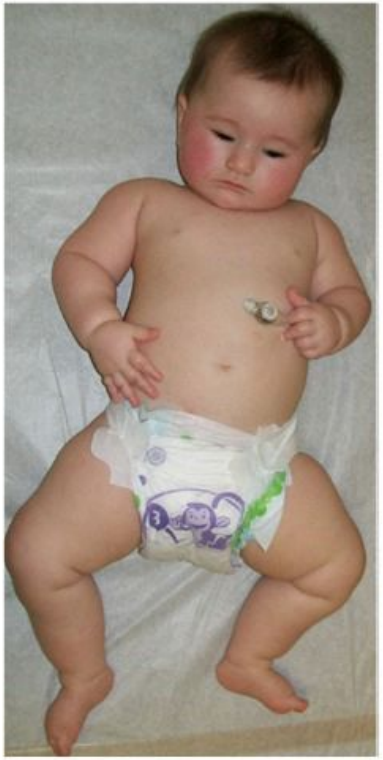


45,X
* Short stature
* Congenital lymphedema
* Horseshoe kidney
* Patella dislocation
* Increased carrying angle of elbow
* Madelung deformity (chondrodysplasia of distal radial epiphysis)
* Congenital hip dislocation
* Scoliosis
* Widespread nipples Shield chest.
* Redundant nuchal skin (in utero cystic hygroma).
* Low posterior hairline.
* Coarctation of aorta
* Bicuspid aortic valve.
* Cardiac conduction abnormalities.
* Gonadal dysgenesis (infertility, amenorrhea)
* ✅Gonadoblastoma if Y chromosome material presents. It is mandatory to do FISH study on all patients and to remove their gonads if Y chromosome material presents.
* learning disabilities (non verbal perceptual motor and visuospatial skills in 70%)
* Developmental delay (in 10%)
* Social awkwardness
* Hypothyroidism (in 15-30%)
* Type 2 diabetes mellitus
* Strabismus
* Cataract Red-green colorblindness (as in males)
* Recurrent otitis media.
* Sensorineural hearing loss
* inflammatory bowel disease and celiac disease

a)

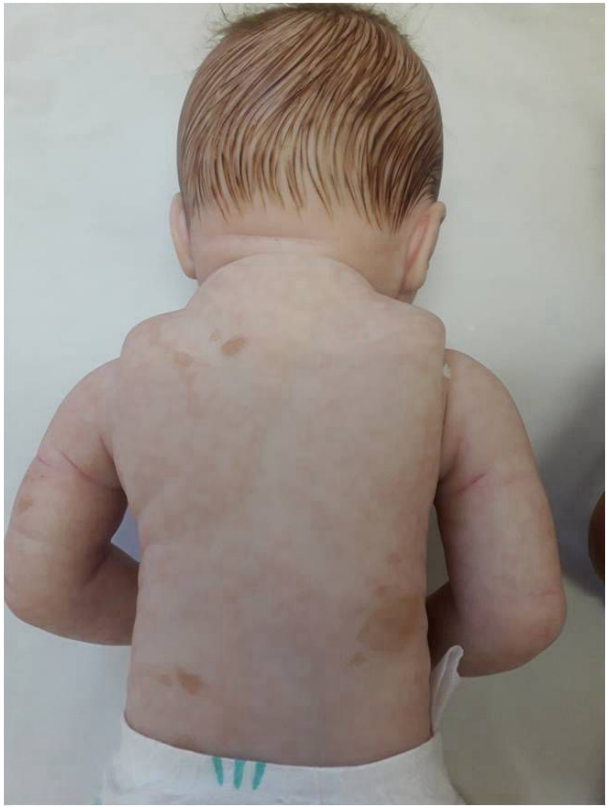


b)



A 15 months old baby with hypotonia and feeding difficulties.

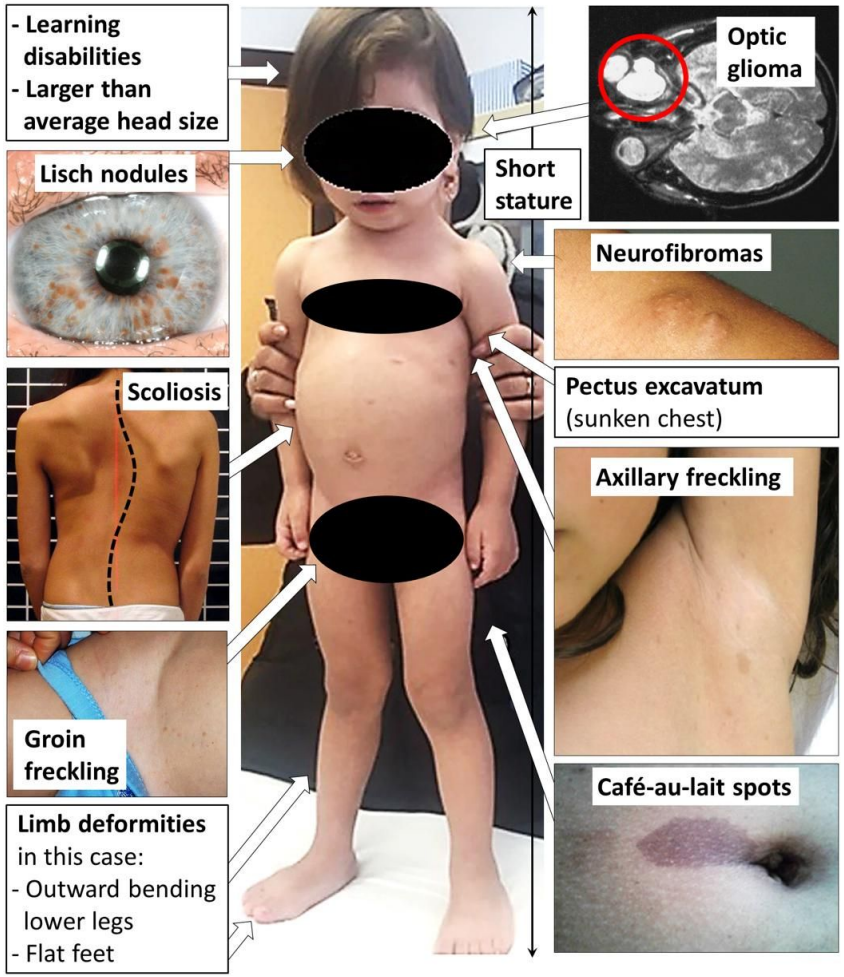
Prader willi



NF1 .
The criteria as follows:
✅ I) If the patient has a first degree relative (parents , siblings, or child who is diagnosed with NF1 and meets at least (1)of the criteria below, the diagnosis of NF1 is made.

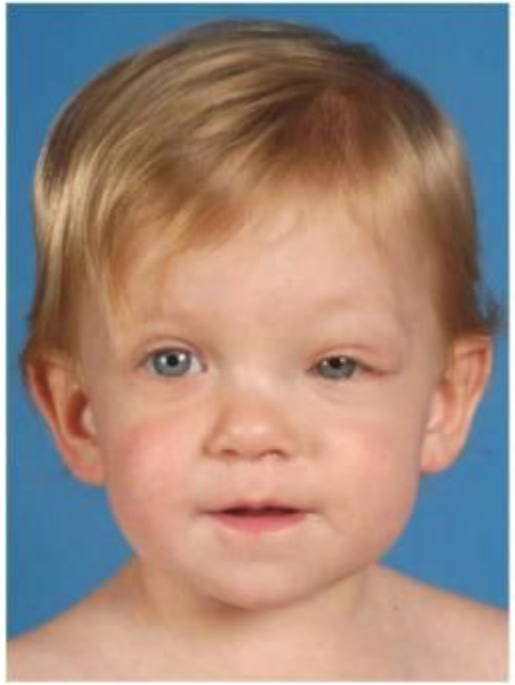
✅ II) If the patient does not have a relative diagnosed with NF1, (≥ 2)of the following must be present:
1) ≥ 6 café-au-lait macules > 5 mm in greatest diameter in prepubertal patients and > 15 mm in greatest diameter in postpubertal patients
2) Freckling in the axillary or inguinal region
3) ≥ 2 neurofibromas of any type or 1 plexiform neurofibroma
4) Optic pathway glioma
5) ≥ 2 Lisch nodules (iris hamartomas) identified by slit-lamp examination or ≥ 2 choroidal abnormalities
6) A distinctive osseous lesion (e.g., sphenoid dysplasia, anterolateral bowing of the tibia, pseudarthrosis of a long bone)
7) DNA test showing a heterozygous pathogenic mutation in the NF1 gene.

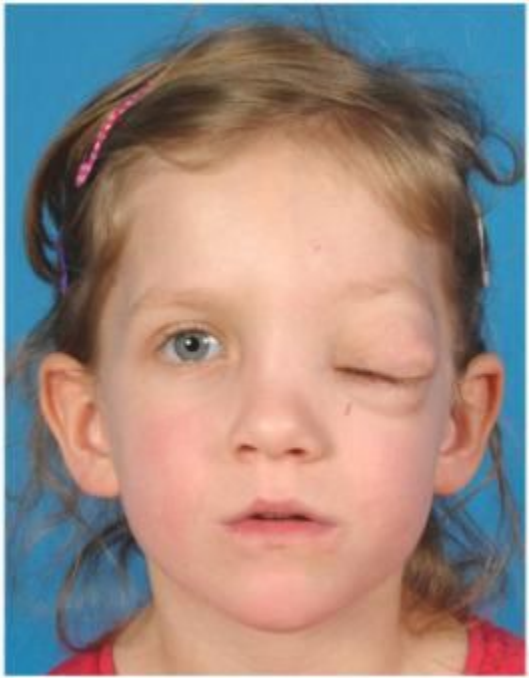
✅Number 7 has to be based on DNA analysis.

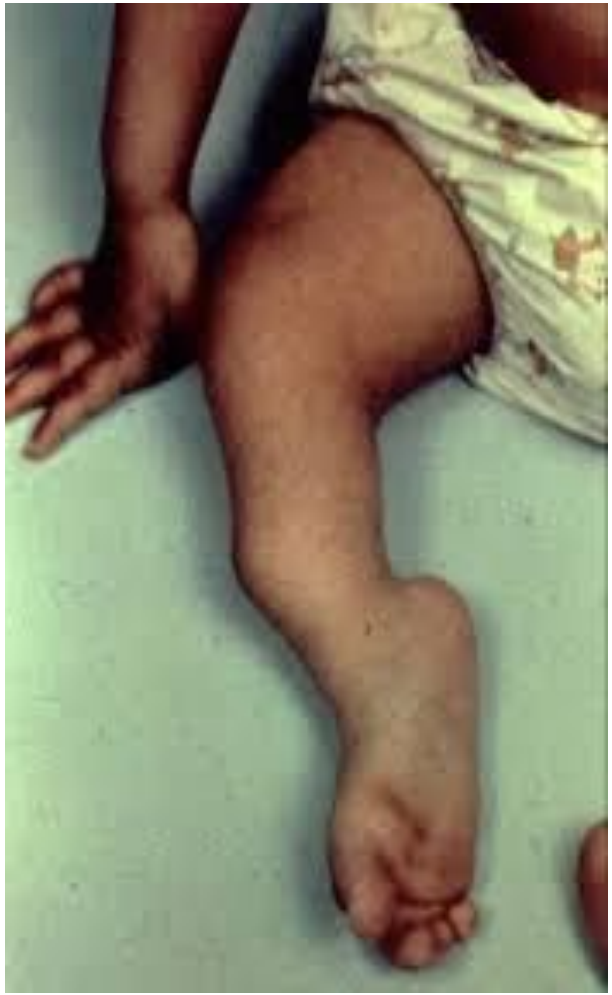


The distinctive osseous lesions include:
1) sphenoid dysplasia
2) anterolateral bowing of the tibia,pseudarthrosis of a long bone

This is the sphenoid dysplasia



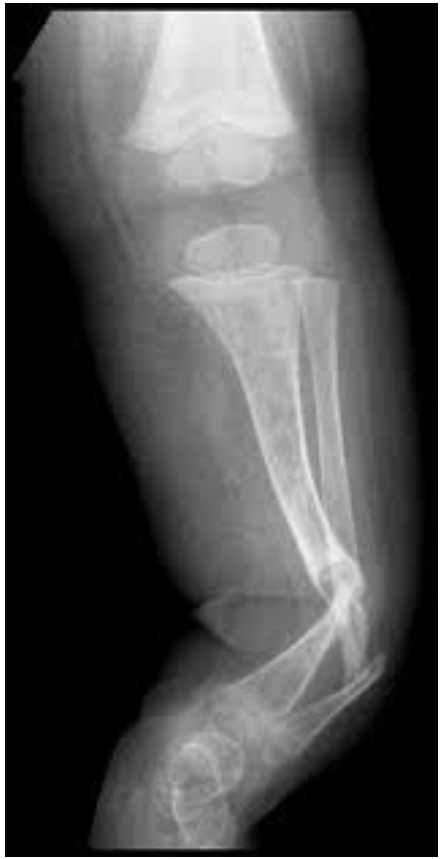




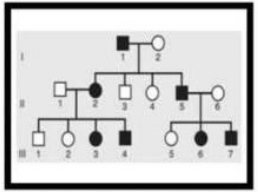
Pseudarthrosis

✅✅A de novo mutation occurs in about 50% of individuals with NF1
✅✅somatic mosaicism is seen in 25-30% of cases
(they don’t have risk to pass it to offspring

This the radiology of PA



How to Read a Pedigree Chart ?

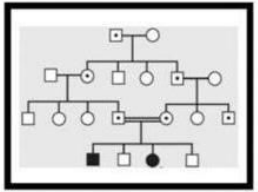


Autosomal dominant

- Both sex equally affected
- Both sexes transmit to offspring
- No skipped generation
- Every child has a parent with disorder

Most common examples

- **Achondroplasia**
- **Von Willebrand disease**
- **Marfan syndrome**
- **Alagille syndrome**
- **Neurofibromatosis 1&2**
- **Myotonic dystrophy**
- **William syndrome**

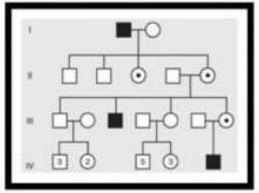


Autosomal recessive

- Both sex equally affected
- Both sexes transmit to offspring
- Skipped generation, or
- No prior family history

Most common examples

- **Sickle cell anemia**
- **Beta thalassemia**
- **Cystic fibrosis**
- **Factor 13 deficiency**
- **Fanconi anemia**
- **TAR syndrome**
- **Phenylketonuria**

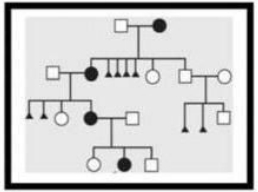


X-linked recessive

- Males much more frequently affected than females
- No father to sun transmission
- Skipped generation

Most common examples

- **Hemophilia A**
- **Hemophilia B**
- **G6PD**
- **Duchenne muscular dystrophy**
- **Lech Nyhan syndrome**
- **OTC deficiency**

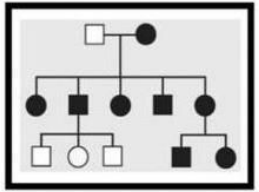


X-linked dominant

- Female twice likely to be affected
- No father to sun transmission
- Affected male 100% transmit it to daughters

Most common examples

- **Hypophosphatemic rickets**
- **Incontinentia pigmenti**
- **Fragile X syndrome**
- **Rett syndrome**
- **Aicardi syndrome**
- **Alport syndrome**
- **Goltz syndrome**



Mitochondrial

- Both sex equally affected
- Only female can transmit the disease
- Affected males never transmit the disease, but females 100% transmit

Most common examples

- **MELAS**
- **MERFF**
- **NARP**
- **Kearns Sayer syndrome**
- **Leigh syndrome**
- **Pearson syndrome**

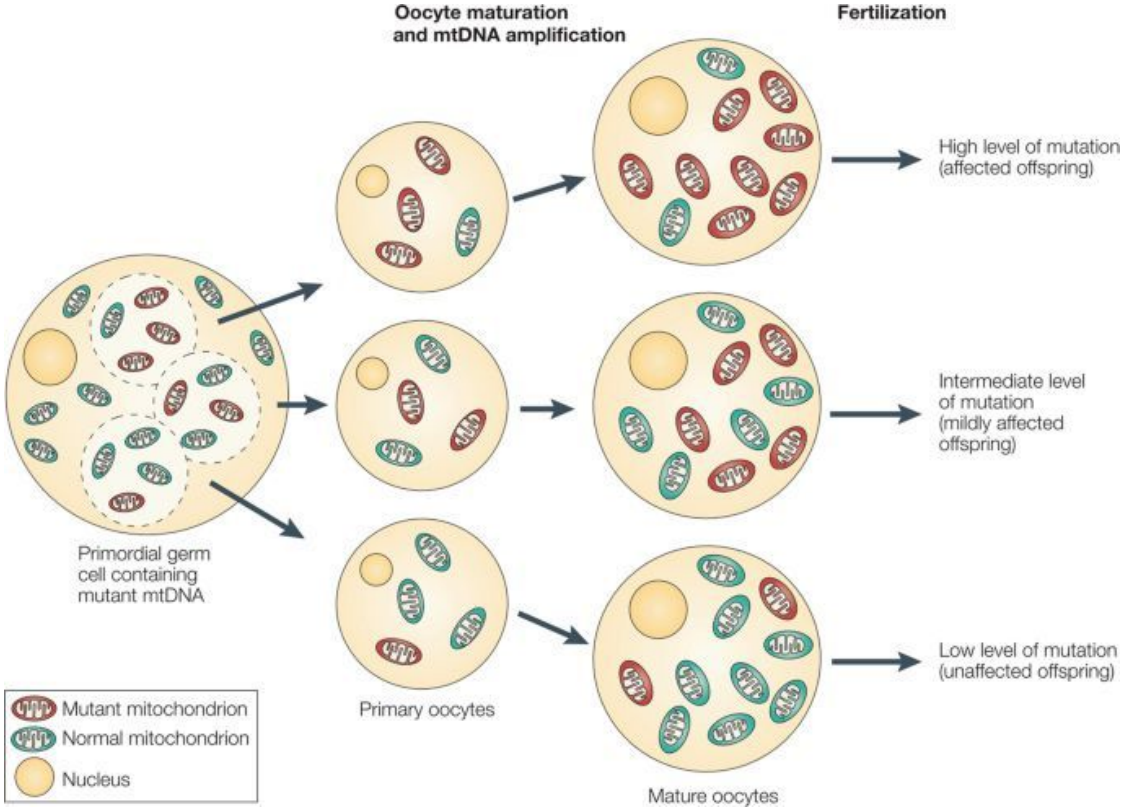
Mitochondrial disorders do not have a 100% risk of transmission. The phenotype is determined by a condition known as heteroplasmy, which refers to the presence of both normal and mutant mitochondria.

Within the cell, there are numerous copies of mitochondrial DNA, making it common for mutations to impact only a portion of the mitochondria, while leaving the majority unaffected. In order to exhibit the disease, a certain threshold of affected mitochondria must be reached.

Therefore, both heteroplasmy and the threshold play a crucial role in the manifestation of the disease.

I once encountered a woman with diabetes who later had a child with diabetes, deafness, and developmental delay. It was discovered that the mother carried the mutation, and the child inherited a higher percentage of mutant mitochondrial DNA, leading to a more severe phenotype.

Based on the abnormal mitochondrial threshold that the child will inherit, the woman has a possibility of having a child with only diabetes.


Oocyte maturation
and mtDNA amplification
Fertilization
High level of mutation
(affected offspring)
Intermediate level
of mutation
(mildly affected
offspring)
Low level of mutation
(unaffected offspring)
Primordial germ
cell containing
mutant mtDNA
Primary oocytes
Mature oocytes
Mutant mitochondrion
Normal mitochondrion
Nucleus

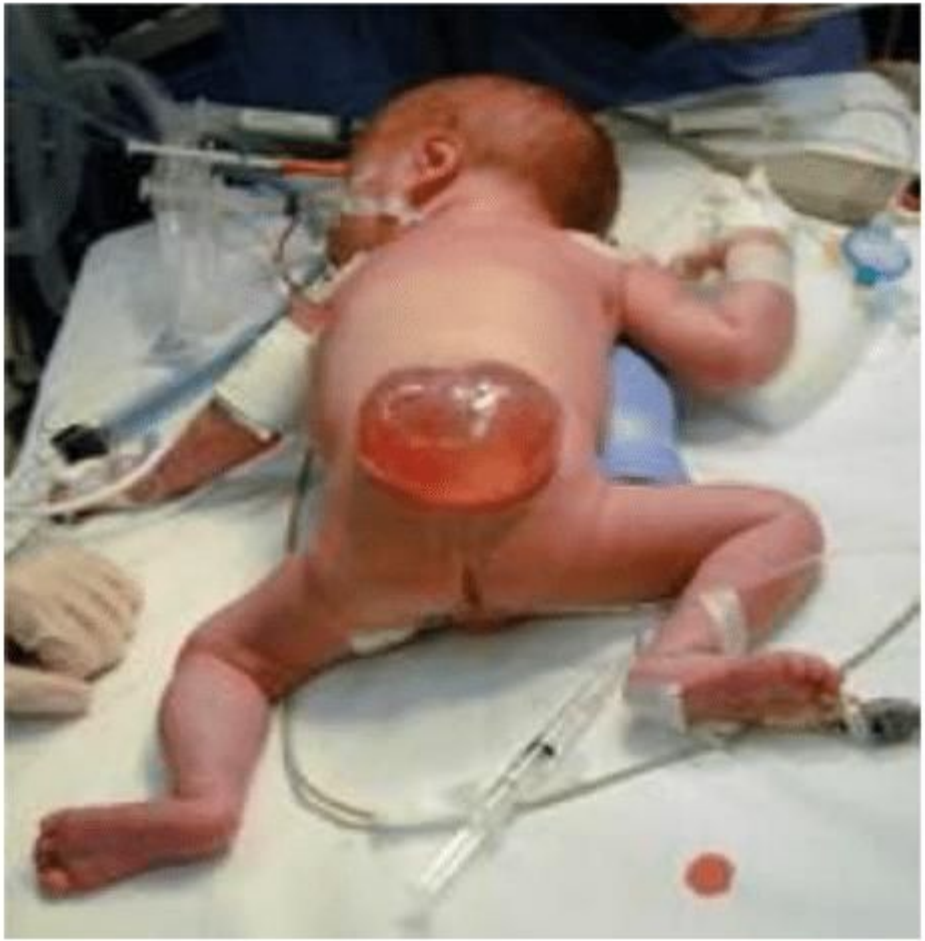
Macrocephaly in glutamic aciduria is typically detected at birth. While other causes progress postnatally which is applied also to microcephalic cases . That is
due to the placenta's removal of abnormal metabolites. However, fetuses affected with metabolic diseases are often compromised in utero and are at higher risk for perinatal complications.

Hypoxic-Ischemic Encephalopathy (HIE) in newborns can be linked to underlying genetic or metabolic disorders in 10-20% of infants.

Genetic causes of Macrocephaly:
- Fragile X syndrome
- Soto syndrome
- neurofibromatosis type I.

Metabolic causes: Postnatal progressive:
- Tay Sachs disease
- Sandhoff disease
- Alexander disease
- Caravan disease
- Glutaric aciduria

A prime example of the effect of the metabolic disorders on the fetus can be seen in PKU, where the newborn will initially have a normal head circumference but will gradually develop microcephaly. Conversely, mothers with PKU who are not closely monitored before conception run the risk of giving birth to a baby with microcephaly and congenital heart defects due to the in utero toxic effects of phenylalanine.



✅✅The Neural tube defect (NTD) has a spectrum that ranges from a simple Spina bifida oculta to the more severe Myelomeningocele.
✅✅It is essential to explore other possible associations for effective genetic counseling. For example, Meckel-Gruber syndrome is a rare and lethal autosomal recessive condition marked by occipital encephalocele, postaxial polydactyly, and bilateral dysplastic cystic kidneys, with a recurrent risk of 25%.

✅✅NTD exhibits a multifactorial inheritance pattern and can be prevented through folic acid supplementation before conception.

✅✅Performing spinal X-rays on the parents is important for accurate counseling, as one parent might have spina bifida occulta, which could increase the risk in future pregnancies.

✅✅Unlike other inheritance patterns, multifactorial inheritance is influenced by
1. the disease's incidence in a given area (for instance, Ireland has the highest incidence of NTD globally)
2. The number of affected relatives. E.g. the recurrence risk in other mode of inheritance is fixed regardless of of the number of affected individuals.
3. The closeness of the relationship to those relatives. If the index is first cousin the recurrence is higher
4. the severity of the condition. If you have unilateral cleft lip the risk will be lower than having bilateral cleft.
5. The gender of the affected individuals which plays a crucial role in multifactorial inheritance. For example, cleft lip is more prevalent in males. If a mother has a cleft lip, she is more likely to pass it on to her offspring compared to if the father is affected.Another example to consider is hip dislocation, a condition frequently observed in females. In cases where a male is diagnosed with congenital dislocation of the hip (CDH), his daughters are at a greater risk compared to if their mother is affected. Therefore, the presence of the disease in individuals of the opposite sex suggests a genetic tendency to pass on the condition to their children.

Cleft lip/palate History taking:
* FHx (for recurrent risk)
* Antenatal Hx (during pregnancy: smoking, medication, any problem)
* Feeding of baby
* Child delivery
* Nasal regurgitation
* Weight loss
* Repeated ear infection

Complications:
1.(middle ear infection “otitis media”
2. Nasal speech or abnormality can’t pronounce certain letters..)

Cleft Lip and Palate

Key points
* Cleft lip and/or palate: gap in lip/palate due to failure of normal development; ranges from unilateral cleft lip or palate to bilateral cleft lip and palate.
* Prevalence: 1.25 in 1000 live births
* Development:
-cleft lip forms due to failure of nasal/maxillary prominences fusion (weeks 5-6).
-cleft palate forms due to failure of palate fusion (weeks 5-12).
* Risk factors:
* 1)family history
* 2)smoking/alcohol during pregnancy, 3) obesity,
* 4)folic acid deficiency
* 5). epilepsy medications (topiramate, sodium valproate).
* 15% due to genetic syndromes:
* 1)DiGeorge syndrome cleft palate, but not lip.
* 2) Pierre-Robin sequence.
* 3)Treacher-Collins).
* 4) Patau syndrome(trisomy 13)
* Diagnosis:
* antenatal ultrasound (weeks 18-21)
* Complications: 1)airway problems (e.g. Pierre-Robin Sequence)
* feeding difficulties,
* conductive hearing loss
* psychosocial impact, dental issues, speech problems.
* Initial management: multidisciplinary approach (airway, feeding, hearing tests, psychological support, dental advice, counselling, genetic counselling); cleft nurse visit within 24-48 hours.
* Cleft lip repair: surgery at ≥3 months
* Cleft palate repair: palatoplasty at 6-12 months old to aid speech/language development.

✅✅Ongoing management

After the initial repair of their cleft lip and/or palate, patients will require regular follow-up until they are around years of age.

This may include:

* Regular audiology assessment of children with cleft palate until around 5 years of age
* Speech and language therapy
* Ongoing psychological support
* Pediatric dentistry advice and treatment
* Orthodontic assessment and treatment if required at around 10 years old
* Monitoring of previous surgical sites for complications and assessing whether further surgery is necessary

In genetics the child obesity is either
I) syndromic or
II) non syndromic (monogenic obesity)

I) syndromes associated with obesity:
✅a) Bardet-Biedl syndrome
(obesity, polydactyly, retinal dystrophy, kidney abnormalities, and learning difficulties.)

✅b) Prader-Willi syndrome

✅c) Alstrom syndrome
(obesity, dilated cardiomyopathy, type 2 diabetes, hearing loss, and progressive vision loss.)

✅d) Cohen syndrome (developmental delay, microcephaly, and distinctive facial features.).

In all syndromic obese children you need to check on their hearing and vision.

II) Non syndromic (monogenic obesity).

is a rare form of obesity caused by mutations in a single gene with autosomal recessive of inheritance:

1. Leptin (LEP) Deficiency : Leptin is a hormone produced by fat cells that helps regulate energy balance and hunger. Mutations in the LEP gene can lead to severe obesity due to unregulated appetite.

2. Leptin Receptor (LEPR) Deficiency: Similar to leptin deficiency, mutations in the LEPR gene prevent the body from responding to leptin, leading to increased food intake and obesity.

3. Pro-opiomelanocortin (POMC) Deficiency: POMC is involved in the production of hormones that regulate appetite and energy expenditure. Mutations can lead to obesity, adrenal insufficiency, and red hair.

4. Melanocortin 4 Receptor (MC4R) Deficiency: MC4R is critical in regulating appetite. Mutations can result in hyperphagia (increased hunger) and obesity, making it one of the most common genetic causes of obesity.

The most common cause of obesity is multifactorial (multiple genes and environments)

Fahad is a 10 yrs old child

His Ht: 160 cm
His Wt: 73 kg.

Calculate his BMI:
Wt per kg over HT by meter *2
73/1.6*2 = 73/ 2.56 = 28.5

1. Case Scenario:

- Name: Fahd
- Age: 13 years
- Gender: Male

Ht: 160 cm
Wt: 73 kg.

BMI: 28.5

For Children and Adolescents:
* Underweight: BMI <5 th%
* Normal weight: BMI > 5th% and <85th%
* Overweight: BMI >85 th% and <95 th%
* Obesity: BMI >95 th%
* Severe (morbid) obesity: BMI >99 th%.

assessment, intervention, and continuous support.

Dietary Habits:
- Consumes high-calorie snacks (chips, cookies) daily.
- Frequently drinks sugary beverages (soda, fruit juices).
- Meals often consist of fast food or processed foods, with limited fruits and vegetables.

Physical Activity Levels:
- Engages in less than 30 minutes of physical activity per day.
- Prefers screen time (video games, TV) over outdoor play.

Family History:
- Family history of obesity and type 2 diabetes on both sides.
- Parents have sedentary lifestyles and often rely on convenience foods.

2. Assessment Skills:

Measuring and Interpreting BMI:
- BMI is calculated using the formula: weight (kg) / height (m^2).
- For children, BMI is interpreted using growth charts that account for age and sex, comparing the child's BMI to percentiles.

Age-Specific Considerations:
- Growth patterns differ,therefore, BMI percentiles are used instead of absolute values.
- Consideration of pubertal development, as growth spurts can influence BMI.

3. Nutritional Assessment:
Daily Food Intake:
- Ask Fahad and his parents about a typical day’s meals and snacks, including portion sizes.

Meal Patterns:
- Inquire about breakfast, lunch, dinner, and snack timings.
- Assess frequency of family meals versus eating alone or in front of screens.

Snacks:
- Discuss types of snacks consumed and their frequency.

4. Counseling Techniques:
- Approach the conversation with empathy, focusing on health rather than weight.
- Use positive reinforcement for healthy choices and set shared goals with Fahad and his family.
- Normalize discussions around nutrition and activity to create a supportive environment.

5. Behavioral Change Strategies:
- Promoting Physical Activity:
  - Encourage family walks or bike rides.
  - Suggest joining a sports team or active clubs at school.

- Healthy Eating:
  - Teach meal planning and cooking healthier versions of favorite foods.
  - Introduce fun, healthy snacks and involve Fahad in grocery shopping.

6. Multidisciplinary Approach:
- Pediatricians:Monitor health metrics (e.g., BMI, blood pressure).
-
- Dietitians:Provide tailored nutrition education and meal planning.

- Psychologists: Address emotional well-being and behavioral aspects related to food and activity.

Collaboration:Regular interdisciplinary meetings to review Fahad's progress and align on strategies.

7. Family Involvement:
- Engage the family in setting realistic goals and activities.
- Suggest family cooking classes or group fitness sessions.
- Provide resources such as community programs, meal planning tools, and nutrition workshops.
8. Cultural Considerations:
- Acknowledge cultural dietary preferences and traditional foods.
- Discuss how cultural norms influence physical activity (e.g., communal games).
- Tailor recommendations to incorporate family traditions in a healthier way.
9. Follow-Up Plans:
- Schedule monthly follow-ups to track:
  - BMI and weight changes.
  - Dietary habits and physical activity levels.
  - Emotional and behavioral adjustments.

10. Prevention Strategies:
- Advocate for school-based programs promoting physical activity (e.g., active recess).
- Support initiatives that increase access to healthy foods in communities.
- Engage (
- parents, schools, and local businesses to develop and sustain initiatives.

OSCE cases:

1) Obesity (history taking)
2) Picture of a baby with measles
3) Picture of an infant with oral thrush and hx of recurrent infection. Approach to SCID
4) Head trauma. (ER Approach)
5) Pyloric stenosis
6) Burn
7) Approach to chronic diarrhea
8) Counseling on refusal of vaccination.

A 1-year-old child presents with mental retardation, blindness, and a high temperature. What test would you request?
She was born in a hospital that does not do newborn screening. She recovered from hepatic failure by supportive treatment. On examination, she has growth retardation,and hepatomegaly

Cataract classification:

I) isolated (non syndromic).
AD, AR, and XL

II) Metabolic:
Cataract is due to accumulation of the toxic metabolite (galactitol).
1. A deficiency of galactose-1-phosphate uridylyl transferase (GALT).
2. Galactokinase deficiency.
3. Galactose epimerase deficiency.
4. Diabetes.
5. Chronic hypocalcemia and hyperphosphatemia

III) syndromic :
1. TORCH infection, mainly rubella.But can be with toxoplasmosis or CMV.
2. Down syndrome
3. Marfan syndrome
4. Lowe syndrome: X- linked (hypotonia, cataract , and RTA)
5. pseudohypoparathyroidism syndrome (PHP).

What feature will not be prevented even if a strict diet has been followed?

1) Learning difficulties.
2) ovarian failure in girls.

A pediatrician usually follows galactosemia cases, especially if they live far from the big centers.

A newborn who looks well presents within 24 hours of birth with jaundice, normal stool and urine color, not febrile. On examination, he was deeply jaundiced. No hepatomegaly, normal LFT, normal CBC, and blood film.

What is the diagnosis?

🚩🚩🚩Red flags to observe in a jaundiced child

1.Age of Onset
- Neonates : Jaundice appearing within the first 24 hours of life is concerning and may indicate hemolytic disease or other serious conditions.
- Prolonged Jaundice: Jaundice persisting beyond 2 weeks in a newborn or beyond 1 month in older infants should be evaluated.

2. Severity of Jaundice
- Rapid Increase: A rapid rise in bilirubin levels, particularly total bilirubin exceeding 15 mg/dL in neonates or higher levels in older children, is concerning.
- Extent of Jaundice: Severe jaundice (e.g., deep yellow coloration of the skin and sclera) should be assessed carefully.

3. Associated Symptoms
- Fever: Presence of fever may indicate an infection or other serious illness.
- Poor Feeding: Difficulty feeding or lethargy can suggest significant illness or metabolic disturbances.
- Vomiting : Persistent vomiting may indicate obstruction or other serious gastrointestinal issues.
- Abdominal Pain : Signs of abdominal pain or distension might suggest hepatobiliary disease or other complications.

4. Physical Examination Findings
- Hepatomegaly or Splenomegaly : this may indicate underlying liver disease or hemolysis.
- Pallor: Signs of anemia can accompany hemolytic processes.
- Bruising or Petechiae: These may indicate coagulopathy or severe hemolysis.

5. Laboratory Findings
- Elevated Conjugated Bilirubin: A high level of conjugated (direct) bilirubin may suggest cholestasis or liver disease.
- Abnormal Liver Function Tests: Elevated liver enzymes (ALT, AST) or alkaline phosphatase may indicate hepatocellular injury or biliary obstruction.

6. Family History
- Genetic Conditions: A family history of metabolic disorders, hemolytic disease, or liver disease can increase suspicion for similar conditions.

7. Failure to Thrive
- Lack of appropriate weight gain or growth may indicate chronic illness or malabsorption due to liver dysfunction.

For every sign and symptom define the red flags that you need to address in your history and PE.

A term neonate. The parents are consanguineous. A first cousin lost her infant with a similar presentation. His general condition deteriorated after delivery, and he required ICU admission for anemia, bleeding, hypoglycemia, hypoactivity, cholestatic jaundice, hepatomegaly, and hepatic dysfunction. Laboratory tests showed anemia (INR > 10), slightly elevated liver enzymes (ALT and AST).

What are your differential diagnoses?

Transaldolase deficiency or Eyaid syndrome (متلازمة العييد) is an extremely uncommon condition that was officially designated after my name in 2015.
The key characteristics include:
- Intrauterine growth restriction (IUGR)
- Cutis laxa
- Dysmorphic features
- Congenital heart defects (CHD)
- Pancytopenia
- Hepatosplenomegaly (in some instances, cholestatic jaundice and liver failure may occur)
- Growth hormone deficiency
- Infertility.

Its significance stems from the fact that it pertains to the metabolic deficiency impacting ATP generation.

With the assistance of Allah, I successfully identified this uncommon disorder. I have diligently kept records of all cases ever since I founded the genetic and metabolic service at the National Guard Hospital. I strongly recommend all residents, regardless of their field, to maintain detailed case databases. Fortunately, in the Gulf region, we are fortunate to have access to electronic health records that can be utilized to build your own database.
Even if you don’t have electric health systems. This practice is crucial e.g. if you’re a pediatrician or a nephrologist, ...
and when a therapy becomes available, you can easily recall your patients.

📣📣📣 OSCE
Examples for pediatric oral exam:
1) 7 yo female with ecchymosis, back pain since 2 weeks.
Approach the case, smear shown, what is Dx>> ALL what is the type.
2)
EEG
Hypsarrythmia 3 hz spikes
Diagnosis, diffential, treatment
3) pictures of eyes signs
name of the sign, diagnosis and treatment
4) ventilated patients who need to adjust their sittings
5) counseling and hx taking for Recurrent UTI with constipation and need other DDx
6) NICU: term baby of a diabetic mother, was in NICU he is on CPAP with low settings and good saturation but in respiratory distress.
Upon The chest X-ray, what is initial management, prognosis.
Ddx:TTN with PHTN.
7)
13 yo female 3 months diarrhea abdominal pain.
What is your Approach upon endoscopy image IBD >> CD, management.
8) A 7 yo girl presents with fever convulsion headache, LOC
- Approach,
- investigation +ve anti NMDA.
- what is the Dx and treatment.
9. -Discussion on DNR
10. Discussion on : ID slides: scarlet fever, measles, tina capitus, herpetic whitlow). What is the Organism, and management.
11. - SCD with stroke
12. MIS-C
13. Nephrotic syndrome with a central line (SEPSIS>> CLBSI>>IE>> worsening vegetation).
14. bloody diarrhea, end diagnosis (polyps)
15)EBM
16) burn ER management

Sessions on OSCE included images of the following conditions:

1)Catract
2)Subcongitival hemorrhage
3)Glucoma
4)Hyphema
5)Conjunctivitis gonorrhea
6)Tear duct obstruction with Dacryocystitis

I’d like to introduce you to the four main branches of medical genetics, which play crucial roles in understanding and managing genetic disorders.

1. Clinical Genetics:

This branch focuses on the diagnosis and management of genetic conditions. Clinical geneticists evaluate patients with genetic disorders, provide counseling, and develop personalized management plans based on genetic information.Understanding the Scope of Genetics in MedicineIt's important to recognize that genetics is not limited to pediatrics. The field of medical genetics actually began with internists, and over time, pediatricians have also become significantly involved.

As medical professionals from various specialties—such as endocrinology, nephrology, cardiology, oncology,….

You can incorporate molecular genetics relevant to your specialty, enhancing your understanding of how genetic factors influence conditions in your area of expertise.Additionally, one vital aspect of clinical genetics is genetic counseling.

🌸Genetic counselors usually hold a bachelor degree in any scientific field , and a master degree in genetic counseling.

They play a crucial role in the healthcare team. They provide information and support to patients and families regarding genetic conditions, helping them understand the implications of genetic testing, the risks of inherited diseases, and the options available for managing these conditions.They work with : oncologists,

OB/Gyn(MFM) laboratories ….

2. Cytogenetics:

Cytogenetics (Karyotyping) studies chromosomes and their structure, function, and abnormalities. It involves analyzing chromosomal changes that can lead to genetic disorders, such as Down syndrome and other chromosomal abnormalities.It includes also FISH, NIPT and CGH tests

3. Biochemical Genetics:

This field examines the biochemical processes within cells and how genetic mutations affect these processes. Biochemical geneticists often work with metabolic disorders(enzymopthies, or inborn errors of metabolism), identifying enzyme deficiencies and other biochemical abnormalities that can lead to various health issues.

4. Molecular Genetics:

Molecular genetics focuses on the structure and function of genes at a molecular level. It involves studying DNA, RNA, and protein synthesis to understand how genetic variations contribute to diseases, paving the way for targeted therapies and genetic testing.

In 2000, I encountered an infant with an encephalocele (a type of neural tube defect, NTD). The mother shared that she had previously lost a child with a similar condition, accompanied by renal failure and polydactyly. Her obstetrician recommended taking folic acid to prevent a recurrence. However, she ended up having another affected baby. The obstetrician failed to recognize other characteristics that would make Meckel-Gruber syndrome the most probable diagnosis for her children. Only the multifactorial NTD can be mitigated through antenatal folic acid supplementation.

In another case, we came across a family from a rural hospital that had lost two children due to microcephaly, seizures, and intracranial calcification. The parents were informed that their kids might have a TORCH infection, despite the absence of the diagnostic antibodies profiles in either the mother or the child.
Upon examining the family, we diagnosed the third child with
pseudo-TORCH syndrome(Baraitser–Reardon syndrome)
an autosomal recessive condition that mimics environmental TORCH.

Thus, making an accurate diagnosis is crucial for providing appropriate counseling to these families.

We published these cases as Intracranial calcifications, microcephaly, and seizure
If not congenital infection, what could it be?

Following this introduction, let us discuss the types of genetic disorders:

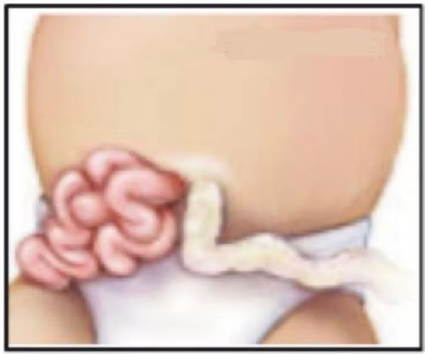
Type of inheritance:
.Typical
. Atypical

Gastroschisis vs Omphalocele

Gastroschisis is a ventral wall defect that results in paraumbilical herniation of the intestine through the abdominal wall without formation of a hernia sac.

Protrusion of intestinal content usually on the right side of the umbilicus . The intestine is not contained in a hernia sac and appears edematous, erythematous, and dull.

Shortened bowel,Malabsorption caused by mucosal damage ,Peritonitis Seen especially in premature infants and associated with cryptorchidism and gastrointestinal stenoses or atresia.



Gastroschisis vs Omphalocele

Omphalocele is a ventral wall defect that results in congenital herniation of abdominal viscera through the abdominal wall at the umbilicus.

The hernia sac is covered by the amniotic membrane and the peritoneum.

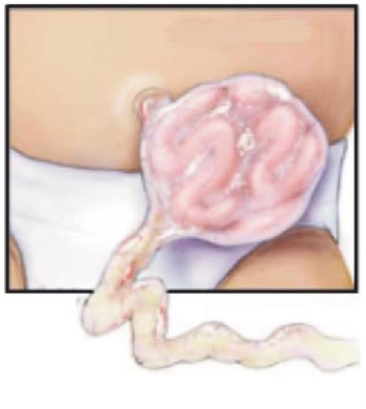
Frequently observed in trisomies (trisomy 21, trisomy 18, and trisomy 13) and Beckwith-Wiedemann syndrome

Often associated with additional malformations (e.g., cardiac, gastrointestinal, genitourinary, and neural tube defects)

Most commonly affects premature infants

Umbilical hernia sac (may contain intestine, liver, and gall bladder)

Features of associated conditions



Dear members,

Due to the growing number of members, Dr. Eyaid transitioned to a **Telegram** channel that can support more participants.
She informed everyone about this over two months to motivate WhatsApp members to join the Telegram forum.
Dr. Eyaid will no longer post any updates on the WhatsApp forum.
Those who are interested can join our forum at

The telegram channel :
https://t.me/+zwh3g18pYkJjMDg8

The telegram Group:
https://t.me/+CN5sPmwbOPEyNzY0

Once you join the forum, you can review any material you may have missed

All Educational materials at:

Drwafaaeyaid.com/education