VARICOCELE

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Question1: Define varicocele?

Answer: Varicocele is defined as abnormally dilated veins of pampiniform plexus or scrotal veins.

Question 2: What are the genital abnormalities associated with varicocele?

Answer: The genital abnormalities associated with varicocele are

- There is failure of testicular growth and development on the side of varicocoele
- Patient may have pain and discomfort
- Male sub-fertility
- Chances of hypogonadism

Question 3: Define incidence of varicocele in males?

Answer: It is present in 15% of normal males. It is associated with primary infertility in around 19 to 41%. It is associated with secondary infertility in upto 81% cases. It is more common on left side.

Question 4: what are the grades of varicocele ?

Answer: There are three grades of varicocele

Subclinical: it is when you detect the varicocele by scrotal ultrasound with Doppler.

Grade 1: detectable only when valsalva manoeuvre is done.

Grade 2: it is palpable without valsalva manoeuvre

Grade 3: when the dilated veins are grossly visible/palpable through the scrotal skin, known as bag of worm appearance.

Question 5: what are the causes of varicocele?

Answer: The exact cause of varicocele is not known. Various phenomena are suggested:

- The left testicular vein inserts into the left renal vein at right angle. This causes turbulent venous flow.
- The valves in gonadal vein could be incompetent or absent which causes retrograde reflux of blood into the scrotum veins during standing position.
- Nut cracker phenomena occurs when the left renal vein is compressed between the superior mesenteric artery and the aorta.

Question 6: what are the mechanisms of varicocele induced impairment of spermatogenesis?

Answer: there are various theories proposed. These are:

1. Temperature theory: as spermatogenesis is temperature dependent there is venous pooling that causes increase in the intra scrotal temperature which results in
   - decrease in testosterone synthesis by leydig cells
   - injury to the germinal cell epithelium
   - there is altered protein metabolism
   - decrease in the sertoli cells function

2. Reflux theory: Reflux of renal and adrenal metabolites freely from left renal vein cause direct injury to the gonads.

Question 7: What are the other mechanisms of varicocele induced impairment of spermatogenesis?

Answer: Other mechanisms are

- Impaired venous drainage due to dilated veins lead to hypoxia in the gonads .
- There is poor clearance of gonadal toxins from the testis .
- As the grade of varicocele increases there is elevated levels of oxidative stress.

Question 8: How will you diagnose varicocele?

Answer: Following are the ways to diagnose varicocele:

- Clinically - by physical examination
- To be confirmed by ultrasound of scrotum/inguinal region with colour Doppler analysis.
- Antegrade or retrograde venography where sclerotherapy or embolization is done.
- Thermography
- Tc 99 pyrophosphate scan.

Question 9: When does varicocele need treatment in a male with/without infertility?

Answer: Following are the indications of treatment in a patient with varicocele:

- Varicocele is palpable i.e. bag of worms appearance on physical examination.
- The couple has known infertility and the only cause seems varicocoele after excluding all the causes.
- Normal fertility of the female partner or a potentially treatable cause of infertility.
- The male partner has abnormal semen parameters or abnormal results from sperm function tests.
- Large varicocele causing symptoms e.g. constant dull pain or hemi-scrotal discomfort or sense of heaviness.
- All adolescents with unilateral or bilateral clinical varicocoeles or ipsilateral testicular hypotrophy (testicular volume $\leq$ 2ml of volume or decrease of 20% volume from contralateral testis).

Question 10: What are the treatment modalities for varicocele?

Answer: The treatment modalities for varicocele are as follows:

- Conservative management: when it is subclinical or not associated with any genital abnormalities.
- Minimal invasive :
  - Sclerotherapy: Antegrade or retrograde
  - Retrograde embolization using foam or gel.
- Laproscopic varicocelectomy.
- Lapro-endoscopic single site varicocelectomy.
- Robotic varicocelectomy.
- Open surgical varicocelectomy.

Question 11: What are the different approaches of surgical varicocelectomy?

Answer: The different approaches of surgical varicocelectomy are:

- Retroperitoneal (Palomo operation)
- Scrotal approach
- Inguinal approach (Ivanissevich)
- High ligation
- Microsurgical inguinal or subinguinal approach

Question 12: What are the recurrence rates with different approaches?

Answer: The approximate recurrence rates with different approaches are:

- Antegrade sclerotherapy – 9
- Retrograde sclerotherapy – 9.8
- Retrograde embolization – 3.8 to 10
- Scrotal approach – not known
- Inguinal approach – 13.3
- High ligation - 29
- Microsurgical inguinal or subinguinal approach – 0.8 to 4
- Laproscopic varicocelectomy – 3 to 7

Question 13: What are the adverse effects and complication rate of Antegrade sclerotherapy?

Answer: Following are the adverse effects of Antegrade sclerotherapy:

- Testicular atrophy
- Scrotal hematoma
- Epididymitis
- Left flank oedema

Complication rate of Antegrade sclerotherapy is approximately 0.3 to 2.2 %.

Question 14: What are the adverse effects of retrograde sclerotherapy?

Answer: Following are the adverse effects of retrograde sclerotherapy:

- Adverse reaction to contrast medium
- Flank pain
- Persistent thrombophlebitis
- Vascular perforation

Question 15: What are the adverse effects of retrograde embolization?

Answer: Following are the adverse effects of retrograde embolization:

- Thrombophlebitis- may cause pain
- Bleeding leading to haematoma
- Infection
- Perforation of the vein
- Hydrocele formation
- Radiological complications – contrast nephropathy
- The coils may migrate or get misplaced
- Retroperitoneal bleeding/haemorrhage
- Retroperitoneal fibrosis
- Obstruction of the ureter

Question 16: What are the adverse effects of varicocele surgery through scrotal approach?

Answer: Following are the adverse effects of varicocele surgery through scrotal approach:

- Atrophy of the testis
- Risk of devascularisation due to arterial damage which may lead to testicular gangrene
- Scrotal bleeding/haematoma
- Post-op hydrocele.

Question 17: What are the complication of varicocele surgery through inguinal, sub-inguinal, high ligation and laproscopic approaches?

Answer: Approach Complication

- Inguinal approach : possibility of missing out a testicular vein
  and high ligation Chances of hydrocele
- Sub-inguinal approach : hydrocele, arterial injury, scrotal bleeding/hematoma
- Laproscopic approach : testicular artery injury and injury to lymph vessels,
  Bowel injury, and injury to vessels & nerve damage
  Pulmonary/CO2 embolism, peritonitis due to bowel injury,
  Bleeding from abdominal wall or any major vessel injury
  Right shoulder tip pain due to pneumoperitoneum,

Pneumo-scrotum due to leakage of CO2, wound sepsis/infection.

ADOLESCENT VARICOCOELE

Question 18: What is the epidemiology of varicocele in adolescents?

Answer: The prevalence of varicocele is around 4-39%.

The age of presentation is around 17 years of age.

Underweight patients have more chances of varicocele.

Overweight and obese patients have less chances of developing varicocele.

The first-degree relatives have higher chances of getting varicocele.

There is a strong association among presence of clinical varicocele and varicose veins.

Question 19: what is the pathophysiology of varicocele?

Answer: Dilated veins of Pampiniform plexus and scrotal veins
↓↓
Increased scrotal temperature
↓↓
Interruption of normal cooling properties of the counter current exchange
↓↓
Decreased expression of heat shock proteins – HSPA2
↓↓
Maturation arrest in spermatocytes and spermatids
↓↓
Failure to develop a defense against heat stress
↓↓
Oligospermia

Question 20: How will you evaluate a case of varicocoele?

Answer: 1. Physical examination: in warm room to grade the varicocoele

- Supine position
- Standing position.

2. To know the size of testis by either ultrasound or orchidometry.

Question 21: What do you mean by orchidometry? How will you measure the size of testis?

Answer: Orchidometry refers to the clinical measurement of the testicular volume. There are various methods to measure the size of testis. These are:

- Prader orchidometry, in which a calibrated string of 12 beads is used as a volume reference.
- ii)Takihara/Rochester orchidometry, in which 15 punched-out cards are used to estimate the volume of a testicle placed within each card.
- Both of these methods over-estimte the testicular volume.

Question 22: How will you measure the size of testis by ultrasound?

Answer: Two formulae are used to measures the volume of testis by Ultrasound. These are

- Ellipdoid formula = Length X Width X Height X 0.52. May under-estimate the testicular volume.
- Length X width X height X 0.71. May over-estimate the testicular volume. This is more accurate.

Question 23: How will you measure differential volume of testis?

Answer: It is measured by the formula:

(Volume RIGHT – Volume LEFT) / Volume RIGHT

OR

(Volume LEFT – Volume RIGHT) / Volume LEFT.

Question 24: What are the indications of surgery in an adolescent male with varicocoele?

Answer: Following are the indications of surgery in an adolescent male with varicocoele:

- Adolescent males
  unilateral or bilateral varicocele
  objective e/o decreased testicular size ipsilateral to the varicocele
  A persistent testis volume differential >20% in children too young to evaluate by semen analysis,
- Low testicular volume in later adolescence.
- When objective e/o decreased testis size not present then, adolescents with varicoceles be followed annually for
  - objective measurements of testis size
  - Semen analyses to detect the earliest sign of varicocele- related testicular injury.

  Varicocele surgery should be done/offered at the first detection of either testicular or semen abnormality.
- An abnormal semen analysis, if a sample can be produced.
- Intervention should be considered before Tanner 5 maturity.
- Pain is less common indication of surgery as compared to adults.
- Rest of the indication are as described for adults above.

Question 25: How will you follow the adolescents with varicocoele?

Answer: Follow up the adolescents with varicocoele:

- Clinical examination is done biannually.
- Examination with an orchidometer is performed annually.
- Annual semen analysis.
- Laboratory tests for androgen production (serum testosterone, FSH, LH) when semen analysis and/or testicular size changes.
- When total testis volume/androgen production/semen analyses are abnormal, then treatment is done/offered.
- Subclinical varicocele should be followed with an eye on left side.

