# INTRODUCTION

- Q.1: What is Hernia ?
- A : Hernia means to bud,
  to protrude ,
  off shoot in Greek ,
  rupture in latin
- Q.2: Define abdominal Hernia .
- A : A bulge of the whole or part of the contents of the abdominal cavity through a weakness in the abdominal wall.
- Q.3 : What is groin?
- A : The area between the abdomen and the upper thigh on either side of the body.

# ANATOMY

- **Q: What is Inguinal Canal ?**
- **A:The inguinal canal is a oblique passage in the lower part of the abdominal wall 3.75cm long which lies above the medial half of the inguinal ligament. It commences at the deep inguinal ring and ends at the superficial inguinal ring.**
- **Q:What is the length of inguinal canal ?**
- **A: The inguinal canal is about 3.75 cm (1 '/2 inch) long and is directed downwards and medially from the deep to the superficial inguinal ring.It is also called as HOUSE OF BASSINI.**

# ANATOMY



- **Q: What is Deep Inguinal ring ?**
- **A: It is an 'U' shaped condensation in the fascia transversalis 1.25 cm above the mid -inguinal point i.e. midpoint between the symphysis pubis and the anterior superior iliac spine. It transmits the spermatic cord in the male and the round ligament of the uterus in the female**
- **Q : What is superficial Inguinal ring ?**
- **A: It is a triangular opening in the aponeurosis of the external oblique muscle. It is situated 1.25cm above pubic tubercle. The superficial inguinal ring gives passage to the spermatic cord and ilio-inguinal nerve in the male and to the round ligament of the uterus and the ilio-inguinal nerve in case of females.It is bounded by superomedial and inferolateral crus.Normally it just admits the tip of the little finger.**

# ANATOMY



- **Q : What is Canal of Nuck ?**
- **A : Inguinal canal in females.**
- **Q: What are the Boundaries of Inguinal canal ?**
- ***Anteriorly*** **—skin, the superficial fascia and the external oblique aponeurosis**
- ***Posteriorly*** **- Transversalis Fascia and Conjoint tendon**
- ***Above*** **- arched fibres of the internal oblique and transversus abdominis fuse to form the conjoined tendon**
- ***Below or floor*** **— by the grooved upper surface of the inguinal ligament**
- **Q : What are the contents of Inguinal canal ?**
- **A : Contents of the inguinal canal.—**

  **1. Ilioinguinal nerve**

  **2. In case of male the spermatic cord**

  **3. In case of female the round ligament of the uterus**



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# ANATOMY

- **Q : What are the contents of Spermatic cord ?**
- **A : (i) The main constituent is the vas deferens.**
  **(ii) Arteries of the spermatic cord are — testicular artery, artery of the vas deferens and artery to the cremaster.**
  **(iii) Pampiniform plexus of testicular veins.**
  **(iv) Lymph vessels of the testis.**
  **(v) Nerves — testicular plexus of sympathetic nerves which accompany the testicular artery and the artery of the ductus deferens and the genital branch of the genitofemoral nerve**
- **Q : What is Hesselbach's Triangle ?**
- **A : It is a triangle which is bounded —**
  **(i) *Medially* — by the outer border of the rectus abdominis muscle.**
  **(ii) *Laterally* — by the inferior epigastric vessels.**
  **(iii) *Below* — by the medial part of the inguinal ligament**

  **Through this Hesselbach's triangle direct inguinal hemia comes out.**

# ANATOMY

- **Q : What are the protective mechanisms ?**
- **A : Obliquity of the inguinal canal , Shutter mechanism , Ball-valve action of the cremaster**
- **What is the importance of Hesselbach's triangle ?**
- **A : neck of the direct hernia lies medial to the inferior epigastric vessels, whereas the neck of the indirect hernia lies lateral to the inferior epigastric vessels.**
- **Q : What are the coverings if Indirect inguinal hernia ?**
- **A : (i)Peritoneum; (ii) Extraperitoneal fat (iii) Internal spermatic fascia (iv) Cremasteric fascia and muscles, the muscular fasciculae being separated by areolar tissue;(v) External spermatic fascia**

# ANATOMY

- Q : What is Myopectineal Orifice of Fruchaud?
- A : It is an osseo – myo- aponeurotic tunnel.It is through this tunnel , all the groin hernias occur.
- Q : What are the boundaries of Myopectineal Orifice of Fruchaud ?
- A : Superior – Arched fibres of internal oblique
- Lateral : Iliopsoas muscle
- Medial : Lateral border of Rectus abdominis
- Inferior : Cooper’s ligament

# ANATOMY

- Q : What is Triangle of Pain ?
- A : **Triangle of pain** is bounded spermatic vessel medially, the iliopubic tract laterally and inferiorly the inferior edge of skin incision. This **triangle** contains lateral femoral cutaneous nerve (commonly injured) and anterior femoral cutaneous nerve of thigh. Nerve injury / entrapment occurs if anchorage of the mesh is performed here.
- Q : What is Triangle of Doom ?
- A :The **Triangle of Doom** is an anatomical triangle defined by the vas deferens medially, spermatic vessels laterally and external iliac vessels inferiorly. This triangle contains external iliac vessels, the deep circumflex iliac vein, the genital branch of genitofemoral nerve and hidden by fascia, the femoral nerve. Injury to the external iliac vessels will occur if dissection is done in this triangle.

# INCIDENCE

- Q : What is the incidence of Inguinal hernia ?
- A : 90% of external abdominal hernias.
- Q : What is the sex ratio ?
- A : Male : Female = 20:1
- Q : What is the incidence of Bilateral inguinal hernias ?
- A :10% of all hernias is bilateral

  20% occult contralateral on Laparascopic evaluation

  33% life time risk to develop hernia in the other side

# CLINICAL

- **Q :What is taxis ?**
- **A : The fundus of the sac is gently held with one hand and even pressure is applied to squeeze the contents into the abdomen while the other hand will guide the contents through the superficial inguinal ring**
- **Q : What is Zieman's technique ?**
- **A : Clinician puts his index finger over the deep inguinal ring (1/2) inch above the midinguinal point and the middle finger over the superficial inguinal ring. The patient is asked to cough or to hold the nose and blow.**
- **Q: What is ring occlusion test ?**
- **A : The hemia must be reduced first. A thumb is pressed on the deep inguinal ring. The patient is asked to cough. A direct hemia will show a bulge medial to the occluding finger but an indirect hernia will not find access, so no bulge.**

# DIFFERENCE BETWEEN DIRECT AND INDIRECT HERNIA



| FEATURE | DIRECT | INDIRECT |
|---|---|---|
| EXTENT INTO SCROTUM | DOES NOT GO INTO SCROTUM | CAN DESCEND INTO THE SCROTUM |
| DIRECTION OF REDUCTION | REDUCE UPWARDS AND STRAIGHT BACKWARDS | REDUCE UPWARDS, LATERALLY AND STRAIGHT BACKWARDS |
| CONTROLLED BY INTERNAL RING PRESSURE | NOT CONTROLLED BY PRESSURE | CONTROLLED AFTER REDUCTION |
| DIRECTION OF REAPPEARANCE | BULGE REAPPEARS | THE BULGE REAPPEARS IN THE MIDDLE OF THE INGUINAL REGION AND FLOWS MEDIALLY TO THE NECK OF SCROTUM |
| PALPABLE DEFECT | DEFECT MAY BE PALPABLE | NOT PALPABLE |
| RELATIONSHIP OF CORD TO SAC | SAC APPEARS MEDIAL TO THE INFERIOR EPIGASTRIC ARTERY AND OUTSIDE THE SPERMATIC CORD | SAC INSIDE SPERMATIC CORD |

# CLASSIFICATION ANATOMICAL

- DIRECT (MEDIAL) – ACQUIRED
  CONGENITAL (OGILVIE)
- INDIRECT(LATERAL) – CONGENITAL
  -COMPLETE
  -FUNICULAR
  -BUBONOCELE
- PANTALOON(BOTH)

# CLASSIFICATIONS - CLINICAL

- **Q : How is Inguinal hernia classified clinically ?**
- **A : Reducible , Irreducible , Obstructed , Strangulated.**
- **Q : What is European Hernia Society Classification ?**
- **A : P = primary hernia ; R = recurrent hernia ; 0 = no hernia detectable**

  **1 = < 1.5 cm (one finger) 2 = < 3 cm ( two fingers) 3 = > 3 cm (more than two fingers) ; x = not investigated**

  **L = lateral/ indirect hernia ; M = medial/ direct hernia ;**

  **F = Femoral**

# CLASSIFICATIONS

- Q :What is NYHUS classification ?
- A : Type 1 - indirect inguinal hernia with normal internal ring (congenital, as seen in infants and children).

  Type 2 - indirect hernia with dilated internal ring but normal posterior inguinal wall (usually seen in children and young adults).

  Type 3 - posterior wall (inguinal floor) defects:

  3A: Direct hernia.

  3B: Indirect hernia with dilated internal ring associated with or caused by weakness of posterior wall; includes sliding hernia. Type 3B hernias are acquired, not congenital.

  3C: Femoral hernia.

  Type 4 - Recurrent inguinal hernia.

# TREATMENT

- Q : What are the investigations ?
- A : **Investigations**
  - Plain x-ray – of little value
  - Ultrasound scan – low cost, operator dependent
  - CT scan – incisional hernia
  - MRI scan – good in sportsman's groin with pain
  - Contrast radiology – especially for inguinal hernia
  - Laparoscopy – useful to identify occult contra lateral inguinal hernia

# What are the treatment options ?

- **Management**
  - ■ Not all hernias require surgical repair
  - ■ Small hernias can be more dangerous than large
  - ■ Pain, tenderness and skin colour changes imply high risk of strangulation
  - ■ Femoral hernia should always be repaired

# TREATMENT

- **Operative approaches to hernia**

  All surgical repairs follow the same basic principles:

  **1)** reduction of the hernia content into the abdominal cavity with removal of any non-viable tissue and bowel repair if necessary;
  **2)** excision and closure of a peritoneal sac if present or replacing it deep to the muscles;
  **3)** reapproximation of the walls of the neck of the hernia if possible;
  **4)** permanent reinforcement of the abdominal wall defect with sutures or mesh

# TREATMENT

- **Operations for inguinal hernia**
  - ■ Herniotomy
  - ■ Open suture repair

  Bassini
  Shouldice
  Desarda
  - ■ Open flat mesh repair

  Lichtenstein
  - ■ Open complex mesh repair

  Plugs
  Hernia systems
  - ■ Open preperitoneal repair

  Stoppa
  - ■ Laparoscopic repair

  TEP
  TAPP

# DIFFERENTIAL DIAGNOSIS – INGUINO SCROTAL SWELLINGS



Inguinoscrotal swellings (except inguinal hernia).—

- (i) Encysted hydrocele of the cord;
- (ii)Varicocele;
- (iii) Lymph varix or lymphangiectasis;
- (iv) Funiculitis;
- (v) Diffuse lipoma of the cord;
  (vi) Inflammatory thickening of the cord extending upwards from the testis and epididymis;
- (vii)Malignant extension from the testis;
- (viii) Ectopic testis;
- (ix) Undescended testis;
- (x) Torsion of the testis;
- (xi) Retractile testis;
- (xii) Enlarged lymph nodes (external iliac and inguinal groups)
- (xiii) Abscess in the inguinal region;
- (xiv) Aneurysm of the external iliac artery

# COMPLICATIONS

**Complications**

- Early – pain, bleeding, urinary retention, anaesthetic related
- Medium – seroma, wound infection
- Late – chronic pain, testicular atrophy

# RECURRENCE RATES

- ■ Herniotomy
  ■ Open suture repair
  Bassini – 8%
  Shouldice – less than 1%
  Desarda -
  ■ Open flat mesh repair
  Lichtenstein – 1%
  ■ Open complex mesh repair
  Plugs
  Hernia systems
  ■ Open preperitoneal repair
  Stoppa
  ■ Laparoscopic repair
  TEP – 2.5%
  TAPP