

**Most Updated and Latest Edition 2022**  
Covering all Recent Updates & Qs up to June 2022 Exams

Most Comprehensive and Only Colored Book on Surgery.  
The Best Supplement for Final Year University Preparation

**6th**  
EDITION

# Surgery Sixer

for NEET & INI-CET Exams

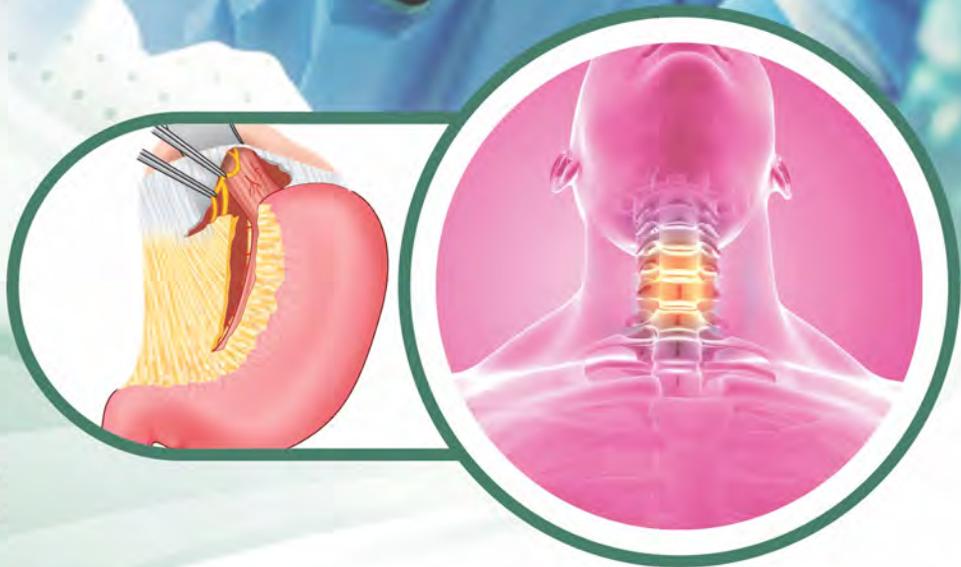
*Concise but complete coverage of the subject in a Simplified and Illustrative way*

*References and updates from Bailey and Love's 27/e, Sabiston's 21/e,  
Schwartz's 11/e, NCCN Guidelines 2022, AJCC 8/e, ATLS 10/e*

## Papers/Questions Covered

- INI-CET 2022 - 20
- Recent Qs (Jan) 2022 - 2018
- FMGE 2022 - 2018
- Expected Clinical Case-Based Qs
- Sample Video Qs
- CBME-Based Subjective Qs with Chapter References

- Written and Compiled by a Leading Faculty and Subject Expert of Surgery
- Enriched with Recent/Latest Updates



**Includes**

**1000+**  
MCQs of  
Recent Exams

**200+**  
CBQs

**200+**  
IBQs

**500+**  
Illustrations/Images



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**R Rajamahendran**

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Schwartz 11/e, NCCN Guidelines 2022, AJCC 8/e, ATLS 10/e*

Sixth Edition

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# Preface

**Dear PG aspirants,**

With the support of all the beloved students and grand success of previous editions, after a break of 2 years due to Coronavirus disease or COVID-19 and changing pattern of exams, I am now presenting to you this masterpiece “Surgery Sixer, 6<sup>th</sup> Edition”. This edition is completely edited and modified suitable for the present generation PG/FMGE/SS aspirants.

Since 2019, I have been seeing a complete change of MCQ pattern in various examinations including INI-CET and FMGE. There is a drastic change from single liner and fact-based question towards Clinical pattern and analysis-based questions. Hence it is very clear in present scenario, no use of doing thousands of MCQs, but you have to know the concepts of each topic in depth. I have removed all those old pattern questions and added only the questions which may be a future eye opener for preparation. During the entire process of writing I focused more on the concepts and giving in-depth illustrations.

Keeping NEXT exam in mind, I have added clinical scenarios at the end of each chapter and will be updating such clinical scenario-based questions in “Surgery Sixer group in Facebook” and “Surgery Sixer Instagram page”. Also I request you to subscribe my YouTube channel- **Dr. Rajamahendran@RRM** for explanatory videos of many concepts in this book.

When you see the complete content which I have made in 550 pages only, though it may appear very concise compared to other PGMEE titles (all 1000+ pages), I have included all the points essential for INI-CET, NEET PG, FMGE in this book. For NEET SS aspirants this is the basics you must not miss during your high level preparation and this book is the best for fast brush up.

Hope you all will love this new AVATAR of surgery sixer—Short, Crisp and Complete.

Kindly send your feedback to [minnalraja@gmail.com](mailto:minnalraja@gmail.com) for better updates of 7th edition for your juniors.

All the best!

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**R Rajamahendran**

# CBSPD

*Dedicated to Education*

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## CBME-Based Subjective Questions with Chapter References\*

Number	COMPETENCY The student should be able to:	Surgery Sixer 6 <sup>th</sup> Edition
<b>GENERAL SURGERY</b>		
<b>Topic: Metabolic Response to Injury</b>		
SU1.1	Describe Basic concepts of homeostasis, enumerate the metabolic changes in injury and their mediators.	Chapter 1
SU1.2	Describe the factors that affect the metabolic response to injury.	Chapter 1
SU1.3	Describe basic concepts of perioperative care.	Chapter 1
<b>Topic: Shock</b>		
SU2.1	Describe Pathophysiology of shock, types of shock & principles of resuscitation including fluid replacement and monitoring.	Chapter 1
SU2.2	Describe the clinical features of shock and its appropriate treatment.	Chapter 1
SU2.3	Communicate and counsel patients and families about the treatment and prognosis of shock demonstrating empathy and care	Chapter 1
<b>Topic: Blood and Blood Components</b>		
SU3.1	Describe the Indications and appropriate use of blood and blood products and complications of blood transfusion.	Chapter 1
SU3.2	Observe blood transfusions.	Chapter 1
SU3.3	Counsel patients and family/friends for blood transfusion and blood donation.	Chapter 1
<b>Topic: Burns</b>		
SU4.1	Elicit document and present history in a case of Burns and perform physical examination. Describe Pathophysiology of Burns.	Chapter 2
SU4.2	Describe Clinical features, diagnose type and extent of burns and plan appropriate treatment.	Chapter 2
SU4.3	Discuss the Medicolegal aspects in burn injuries.	Chapter 2
SU4.4	Communicate and counsel patients and families on the outcome and rehabilitation demonstrating empathy and care.	Chapter 2
<b>Topic: Wound Healing and Wound Care</b>		
SU5.1	Describe normal wound healing and factors affecting healing.	Chapter 1
SU5.2	Elicit document and present a history in a patient presenting with wounds.	Chapter 1
SU5.3	Differentiate various types of wounds, plan and observe management of wounds.	Chapter 1
SU5.4	Discuss medico-legal aspects of wounds.	Chapter 1
<b>Topic: Surgical Infections</b>		
SU6.1	Define and describe the aetiology and pathogenesis of surgical Infections	Chapter 1
SU6.2	Enumerate Prophylactic and therapeutic antibiotics. Plan appropriate management	Chapter 1
<b>Topic: Surgical Audit and Research</b>		
SU7.1	Describe the Planning and conduct of Surgical audit	—
SU7.2	Describe the principles and steps of clinical research in General Surgery	—
<b>Topic: Ethics</b>		
SU8.1	Describe the principles of Ethics pertaining to General Surgery	—
SU8.2	Demonstrate Professionalism and empathy to the patient undergoing General Surgery	—
SU8.3	Discuss medico-legal issues in surgical practice.	—

\*Important competency-based topics covered

# General Aspects in Surgery

# 1 CHAPTER

(Based on Bailey and Love's 27<sup>th</sup> Edition—Chapters 1–21)

## TOPIC 1: NUTRITION

### ASSESSMENT OF NUTRITION

- Midarm Circumference
- Triceps Skin Fold thickness
- Body Mass Index
- Albumin (Best of all methods in Surgical Patients)

### Malnutrition Universal Screening Tool

**THE MUST TOOL- Clinical assessment tool of malnutrition:  
Based on 3 Factors:**

BMI:	Weight loss in 3-6 months	Acute disease effect
>20	<5%	Add a score of 2 if there is reduced intake >5 days
18.5- 20	5-10%	
<18.5	>10%	

On counting the score: overall risk of undernutrition obtained:

- Low risk: Can give routine care
- Medium risk observe
- 2 or more- High risk : Treat them

### Indications for Artificial Nutrition

- Any patient who has sustained > 7 days of inadequate intake
- Any patient who is anticipated to have no intake for > 7 days.

### TYPES OF NUTRITION

Enteral Nutrition	Parenteral Nutrition
Nutrition given via GI tract	Nutrition given via Veins
1. Sip feeding	1. Peripheral Parenteral
2. Tube feeding	2. Central Parenteral
<ul style="list-style-type: none"> <li>▪ Nasogastric tube (Ryles tube)</li> <li>▪ Nasojejun tube</li> <li>▪ Feeding Gastrostomy (PEG)</li> <li>▪ Feeding Jejunostomy.</li> </ul>	3. Peripherally Inserted Central Catheter

### Enteral Nutrition

#### Nasogastric Feeding

#### Ryles Tube

- Ryles tube length ranges from standard 105 cm to even 120 cms.
- It is coated with radiopaque line to facilitate its identification through X rays.

It is of two types:

- Fine bored tubes (8 -12 Fr) are preferred for enteral feedings, which require prolonged use to be tolerated by nasal mucosa
- Large bore tubes (14Fr or more) are for decompression and lavage (Levin or Ewald tube)

Selecting the length to be inserted in an adult and children:

- **NEX method (in adults)** – Nose to ear to xiphisternum
- Nose to around ear lobe and to umbilicus
- **NEMU (preferred in children)** – Nose to ear lobe to mid point between xiphoid and umbilicus



**Figure 1:** Ryles Tube

Ideal method to insert Ryles Tube:

- Sitting with Neck flexed
- Fowler's Position

**Once desired length mark has reached, confirm its position by:**

- Auscultating with stethoscope in epigastric region by simultaneously pushing air in an empty syringe through the external port of tube
- Look for reflux of gastric contents in the tube
- Aspiration of secretion and test with litmus paper for pH (**Most ideal method\*\***)

### Practical Points

- Cross matching is done in 45 minutes in blood bank
- Blood received must be transfused in 1- 4 hours
- Uncrossmatched Blood used in Trauma is O negative (males- O Positive)
- Uncrossmatched Plasma used in Trauma is AB
- **Autologous blood:** For patients undergoing elective surgery they predonate their blood upto 3 weeks\* before surgery for re transfusion during operation.
- **Massive Blood Transfusion:** Replacing whole body blood volume (10 units of Blood in adults)
- **1<sup>st</sup> Sign in Unanesthetized patients:** Wrong matched blood shows Itching\*\*
- **1<sup>st</sup> Sign in anesthetized patients:** Wrong matched blood transfusion shows unusual Bleeding from operative site –followed by fall in BP – Hematuria\*



### Extra Edge

#### Scores Deciding On Massive Blood Transfusion

##### The Trauma Associated Severe Hemorrhage (TASH) Score.

- Uses 7 variables:
  - Systolic BP
  - Hemoglobin,
  - FAST,
  - Presence long-bone or pelvic fracture,
  - Heart Rate
  - Base excess(BE), and
  - Gender.
- If the score is more than 27- there is 100% need of Blood transfusion

##### McLaughlin score:

- Uses four variables to predict the need for massive transfusion:
  - HR > 105,
  - SBP < 110 mm Hg,
  - PH < 7.25, and
  - Hematocrit < 32%.
- Each variable present indicates a 20% incidence of massive transfusion.
- When all four variables are present, an 80% likelihood of the need for massive transfusion was present.

### Complications of Massive Transfusion

- Coagulopathy
- **Hypocalcemia\*** (due to binding of ionized calcium by citrate used as anticoagulant)
- **Hyperkalemia\*** (due to RBC lysis)
- **Hypokalemia also can happen**
- **Hypomagnesemia**
- Hypothermia
- Volume overload
- Dilutional thrombocytopenia
- Decreased oxygen delivery (due to decrease in 2, 3 DPG)
- **Metabolic Alkalosis** (even though the stored blood contains pH-6.3, Because of massive transfusion sodium citrate is metabolized in liver to sodium bicarbonate)
- Rare- Metabolic Acidosis\*
- Iron Overload

### Complications of Regular Blood Transfusion

#### IMMUNE MEDIATED

Acute	Delayed
Hemolytic reaction	Hemolysis
Febrile nonhemolytic reaction	Post transfusion purpura
Urticaria	Thrombocytopenia
Anaphylaxis	GVHD
Allergy	HLA and RBC allo-sensitization
TRALI	

#### NONIMMUNE MEDIATED

Acute	Delayed
Sepsis	Infection
Overload	Iron overload
Metabolic alkalosis	
Hyperkalemia	
Hypocalcemia	
Air embolism	

- **Febrile non Haemolytic Transfusion reaction\*** (Most Common)- Due to WBC present – **Leukocyte reduction filters remove the WBC\***. To avoid this reaction – **Leukocyte reduction filter is used**
- **Infection:**
  - Bacterial infection (as a result of faulty storage)
  - Hepatitis- B, C, G
  - HIV- 1,2
  - HTLV- 1 and 2
  - **Malaria\*\***
  - West Nile virus, Parvo virus B-19, HHV-8, CMV
- **Transfusion related acute lung injury – TRALI** (usually M/C from FFP)
- Patients who receive repeated transfusions over long periods may get **iron overload**. Each transfused unit of RBCs contain approximately **250mg elemental iron\*\***



Figure 6: Leukocyte reduction filter

## TOPIC 4: OPERATION THEATER, INSTRUMENTS AND PROTOCOLS

### SURGICAL SAFETY LIST (WHO UK PROCESS)

- Sign in Check done before induction of anesthesia\*
- Time out Check done before Skin incision\*
- Sign out Check done before patient leaves operating room\*\*
- Please remember there is no column known as Time in\*\*

Sign in	Time out	Sign out
<ul style="list-style-type: none"> <li>• Name</li> <li>• Identity</li> <li>• Confirm the disease</li> <li>• Site marked or not</li> <li>• Written consent</li> <li>• H/o Drug Allergy</li> <li>• Associated diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion between Surgeon and anesthetist.</li> <li>• Anticipated time of surgery and blood loss</li> <li>• Prophylactic antibiotics given or not is noted.</li> </ul>	<ul style="list-style-type: none"> <li>• Look for gauze count, instrument count</li> <li>• Any instrument problem is addressed here.</li> </ul>

- Best method to prevent operating wrong limb- Surgeon and Anesthetist examining each other separately.

### Wearing of PPE kit

**1. Gown**

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



**2. Mask or respirator**

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit snug to face and below chin
- Fit-check respirator



**3. Goggles or face shield**

- Place over face and eyes and adjust to fit



**4. Gloves**

- Extend to cover wrist of isolation gown



Figure 27: Sequence of PPE kit removing

- Take high risk cases in 1st round
- Avoid unnecessary personnel in OT
- Transfer only in Kidney Tray



*Bailey's and Love 27/e update*

#### Universal Precautions in HIV/Hepatitis Patients:

- Use of **Full face mask with spectacles\*\***
  - Waterproof full body disposable gowns and drapes.
  - Wear Boots and not Clogs to avoid sharp instrument drop injury
  - Double Gloving- Larger one inside and regular one on outside\*\*
  - Essential personnel in theater.
  - Avoid unnecessary movement in theater.
  - Pass sharp instruments in Kidney trays.
  - Slow and minimized technique with minimal bleeding.
- Please note needle stick injuries are most common injury and most common in the **nondominant index finger** during operative surgery\*\*

#### Universal Precaution Kit: (Personal Protective Equipment kit)

- Boots
- Goggles (Face shield)
- Plastic Gowns
- Double gloves (Inside wear bigger gloves and outside your size gloves)

## Multiple Choice Questions

## INI-CET QUESTIONS

- Blood from donor in Indian setup is usually screened for all; except:** (INI-CET May 2022)
  - Malaria
  - Hep B
  - HIV
  - Dengue
- Angle between skin and needle when performing intermittent sutures:** (INI-CET May 2021)
  - 70 degree
  - 90 degree
  - 45 degree
  - 60 degree
- A patient underwent mastectomy and a drain is kept. What type of drain is this?** (INI-CET 2021, Nov Question)



- Semi open
  - Semi closed
  - Open
  - Closed
- Nasogastric tube length is measured by:** (INI-CET November 2021)
    - Nose to ear and Xiphoid process
    - Nose to Xiphoid and umbilicus
    - Nose to mouth and Pubic symphysis
    - Nose to Xiphisternum
  - With cannula shown below what is the flow rate/ minute?** (INI-CET November 2021)

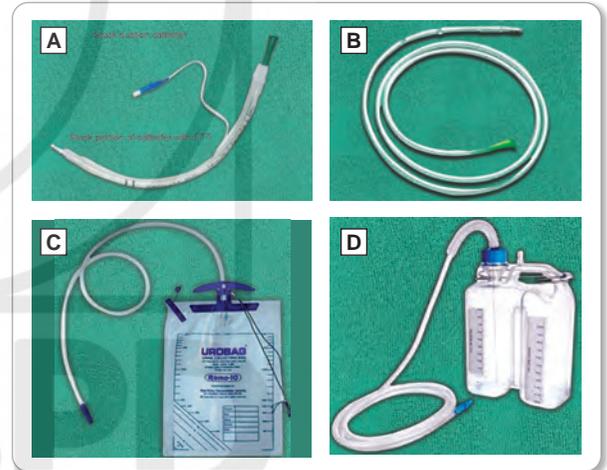


- 66 ml
- 86 ml
- 106 ml
- 56 ml

- Inflation during laparoscopy is done with help of which instrument?** (INI-CET May 2021)



- Jacob
  - Mathew
  - Verres needle
  - Alex
- Match the following:** (INI-CET May 2021)



- ET and oral suction tube
  - Ryle's tube
  - Urobag
  - Underwater seal
- A-1, B-2, C-3, D-4
  - A-2, B-3, C-4, D-1
  - A-2, B-4, C-3, D-1
  - A-3, B-4, C-2, D-1
- Which is the most common cause for readmission after day care surgery?** (INI-CET May 2021)
    - Hypotension
    - Nausea and vomiting
    - Bleeding
    - Apnea
  - An asymptomatic patient recovered from Covid infection. You are planning for an elective surgery. When will you do?** (INI-CET May 2021)
    - 4 weeks
    - 6 weeks
    - 8-10 weeks
    - 12 weeks

## Answers with Explanations

### 1. Ans. (d) Dengue

(Ref: Bailey and Love 27<sup>th</sup> edition page 22)

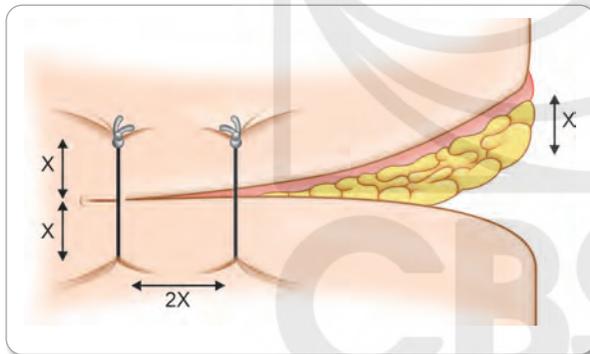
- In the UK, up to 450 mL of blood is drawn, a maximum of three times each year.
- Each unit is tested for evidence of hepatitis B, hepatitis C, HIV-1, HIV-2 and syphilis.
- Donations are leukodepleted as a precaution against variant Creutzfeldt– Jakob disease (this may also reduce the immunogenicity of the transfusion).
- In India, it is mandatory to test every unit of blood collected for **hepatitis B, hepatitis C, HIV/AIDS, syphilis and malaria.**

### 2. Ans. (b) 90 degree

(Ref: Bailey and Love 27<sup>th</sup> edition page 91)

#### Interrupted skin sutures:

- The needle needs to be inserted at right angles to the incision and then pass out at right angles to the incision.
- The distance (X) from the entry point of the needle to the edge of the wound should be equal to the same depth (X) of the tissue being sutured.
- The distance between the successive sutures must be twice this distance (2X)



### 5. Ans. (b) 86 ml

(Ref: Internet Sources)

Gauge	Color Code	Ext. Dia. mm	Length mm	Flow Rate mL/mm	Indications
14G	Orange	2.1	45	240	Trauma, surgical procedures
16G	Grey	1.8	45	180	Trauma, surgical procedures
18G	Green	1.3	32 / 45	90	Trauma, quick blood transfusion
20G	Pink	1.1	32	60	Normal IV or blood transfusion
22G	Blue	0.9	25	36	Children, older adults
24G	Yellow	0.7	19	20	Neonates, children, old elderly
26G	Violet	0.6	19	13	Neonates

### 3. Ans. (d) Closed

(Ref: Bailey and Love 27<sup>th</sup> edition page 99-101)

- Drains are inserted to allow the fluid or air that might collect at operation site or in a wound to drain freely to the surface.
- They are used as Prophylactic in elective surgery and as therapeutic in emergency surgery.
- Three types of drains are used:

1. Open drains that utilize the principles of gravity
2. Semi open drains that work on principle of capillary effect
3. Closed drains that utilize the Suction

- There are huge controversies in usage of the drains by the surgeons in various places- the only area in alimentary tract where it is still routinely advocated is ESOPHAGEAL Surgery\*\*

### 4. Ans. (a) Nose to ear and Xiphoid process

(Ref: Bailey and Love 27<sup>th</sup> edition page 285)

- NEX rule- Nose to Ear and Ear to Xiphoid process is used to calculate the length of Nasogastric tube.
- MC complication of the Nasal tubes is blockage. All tubes must be washed with water at least twice daily.
- Chymotrypsin may salvage a partially obstructed tube
- Guidewires must not be used as they may perforate the tube and cause contiguous damage.
- Fine bore tubes < 3mm diameter are used if feeding is used for > 1 week.

# Oral Cavity and Malignancy

## 3 CHAPTER

(Based on Bailey and Love's 27<sup>th</sup> Edition—Chapters 22–30)

### TOPIC 1

#### SYPHILIS IN ORAL CAVITY

Primary	Secondary	Tertiary
<ul style="list-style-type: none"> <li>• <b>Chancere</b> on lip or tongue</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Mucous patches</b>- Lip, Cheeks and Fauces</li> <li>• <b>Hutchinson's Warts</b>- Condyloma over mid line of tongue</li> <li>• <b>Snail Track ulcers</b>** (Fig. 1)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Gumma</b> (MC In anterior 2/3<sup>rd</sup> tongue)</li> <li>• <b>Glossitis</b> (pre-malignant)</li> </ul>



Figure 1: Snail Track Ulcers

#### ULCER OF ORAL CAVITY

- **Apthous ulcers** – small, multiple, painful ulcers
- **Dental ulcer** – along lateral margin of tongue due to sharp teeth
- **TB ulcer** – at tip of tongue, painful, with nodes, ulcer has undermined edge
- **Gummatous ulcer** – midline anterior 2/3 tongue, punched out with wash leather slough painless with induration
- **Carcinomatous ulcer** – usually single, painless initially (painful at advanced stages)

#### Oral Cavity Cancers

##### Conditions associated with malignant transformation

- **High-risk lesion**
  - Erythroplakia
  - Speckled erythroplakia
  - Chronic hyperplastic candidiasis
- **Medium-risk lesions**
  - Oral submucous fibrosis
  - Syphilitic glossitis
  - Sideropenic dysphagia (Paterson-Kelly syndrome)
- **Low-risk/equivocal-risk lesions**
  - Oral lichen planus
  - Discoid lupus erythematosus
  - Discoid keratosis congenita

#### LEUKOPLAKIA

- White patch or plaque involving wide areas of oral mucosa (Fig. 2A)
- Induration -suggests malignancy.
- 2.4% malignant transformation at 10 years, 4% at 20 years
- **Speckled leukoplakia** has the Highest rate of Malignant transformation\*\*
- Incidence among smokers: 20%; Non smokers -1%
- Can be managed conservatively – avoid smoking, carbon dioxide laser excision



Figure 2A: Leukoplakia

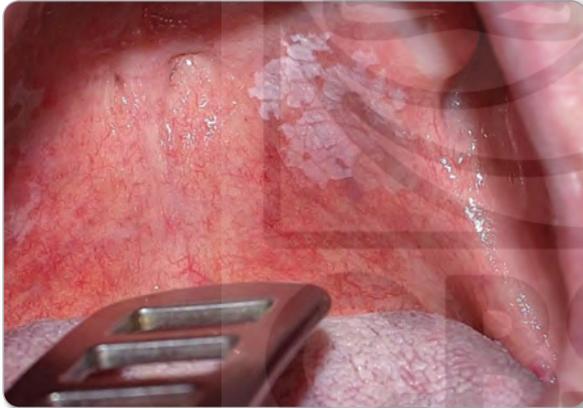
## Multiple Choice Questions

## INI-CET QUESTIONS

1. A growth on the lateral border of anterior tongue measuring 2.5×3.5 cm with local invasion and intact mobility. HPE came out as well differentiated squamous cell carcinoma. There were no neck nodes palpable. Which is the staging for the same as per new TNM classification? (AIIMS May 2018)
  - a. T3 N0 M0 STAGE III
  - b. T3 N0 M0 STAGE IVA
  - c. T2 N0 M0 STAGE III
  - d. T4 N0 M0 STAGE IVB
2. Correct pairing of the neck nodes: (AIIMS November 2018)
  - a. Level 3- Cricoid to clavicle
  - b. Level 4- Hyoid to clavicle
  - c. Level 5- Base of Skull to Cricoid
  - d. Level 6- Hyoid to Clavicle

## NEET PG QUESTIONS

3. 60-year-old non-diabetic, Chronic alcoholic patient with multiple oral lesions shown. The lesion is painful with burning sensation. What is the diagnosis? (NEET PG 2022)

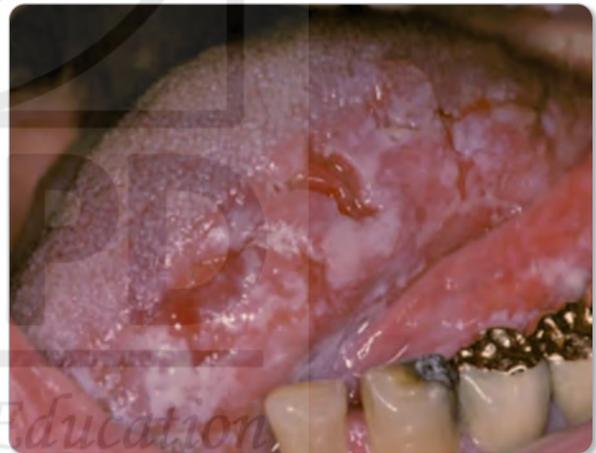


- a. Erythroplakia
  - b. Leukoplakia
  - c. Submucous fibrosis
  - d. Melanoplakia
4. Weber-Ferguson Incision is used for operating which cancer (NEET PG 2018)
    - a. Breast cancer
    - b. Hard palate cancer
    - c. Thyroid cancer
    - d. Cancer Penis
  5. Main disability following Classical RND is due to paralysis of which Muscle? (NEET PG 2018)
    - a. Subscapularis
    - b. Deltoid
    - c. Trapezius
    - d. Pectoralis major

6. Preferred treatment approach for locally advanced head and neck cancers is: (NEET PG 2018)
  - a. Radiotherapy alone
  - b. Surgery alone
  - c. Induction chemotherapy followed by radiotherapy/surgery
  - d. Concomitant chemotherapy with radiotherapy
7. N-3 TNM Staging of Head and neck tumors shows (NEET PG 2018)
  - a. Metastasis in lymph nodes > 3 cm size
  - b. Metastasis in lymph nodes > 5 cm size
  - c. Metastasis in lymph nodes > 6 cm size
  - d. Metastasis in axillary nodes
8. Nodal dissection up to level 3 nodes is done for which oral cancer? (NEET PG 2018)
  - a. N1
  - b. N2
  - c. N3
  - d. N4
9. Modified RND includes which of the following?
  - a. I-III
  - b. I-IV
  - c. I- V
  - d. I- VII

## FMGE QUESTIONS

10. Most common oral cancer: (FMGE 2019)
  - a. Squamous cell ca
  - b. Adenocarcinoma
  - c. Transition cell ca
  - d. Mucoepidermoid
11. Identify the lesion shown in the image: (FMGE June 2021)



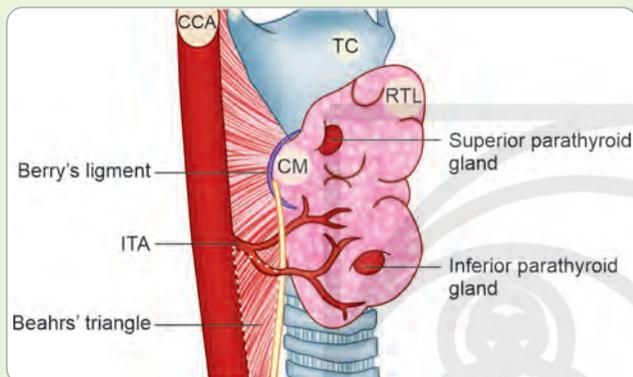
- a. Leucoplakia
  - b. Erythroplakia
  - c. Aphthous ulcer
  - d. Syphilitic chancre
12. Which of the following is the most common site of malignancy in head and neck? (FMGE June 2021)
    - a. Oral cavity
    - b. Nasopharynx
    - c. Larynx
    - d. Oropharynx



Bailey's and Love 27<sup>th</sup> Edition

### Recurrent laryngeal nerve applied anatomy:

- Most common site of injury of RLN is at **Behr's triangle (Riddle's triangle)**
  - Laterally- common carotid artery
  - Medially by tracheoesophageal groove
  - Superiorly inferior thyroid artery



- Tubercle of Zuckerkandl= most posterior lateral portion part of thyroid, also known as Pointing tip toward RLN.
  - Close to Berry's ligament- which is a condensation of pretracheal fascia
    - ◆ Connecting thyroid to trachea
    - ◆ Reason for movement of thyroid with deglutition.

### Injury of RLN- Management

- U/L Injury: hoarseness – recover within 3 months
- B/L injury: Stridor post op – 1st sign due to B/L nerve going for Cadaveric position

### Management of Stridor due to Bilateral RLN Injuries

- Step 1- Immediate Reintubation
- Wait for 24-48 hours (Many neuropraxias will recover with steroids)
- Extubate with entire team ready for Tracheotomy.
- If there is stridor again- and Both nerves not functioning- Tracheostomy done.
- After few months, if it is a permanent damage, we must go for some special procedures:
  - Advice Arytenoidectomy/ Lateralization of cord

### Physiology

- RDA for I<sub>2</sub> – 0.1 – 0.15 mg/ day

### Nutshell: Anatomy

- Lingual thyroid – Most common (M/C) site of ectopic thyroid—
  - due to undescended thyroid located in foramen cecum
  - C/F-deglutition problems.
- 3 arteries- STA, ITA, ARTERIA THYROIDEA IMA – Ligate close to gland
- 4 veins: STV, MTV, ITV, Kocher's VEIN
- ELN- M/C nerve injury- Cernea classificaiton
- ILN- Paroxysmal nocturnal cough
- RLN- M/C injured in Behr's triangle (Between TE groove, CCA and ITA Posterolaterally)

### Steps in Synthesis (Mnemonic- TOBC)

- Trapping
- Oxidation (iodine to iodide via thyroid peroxidase)
- Binding iodide with thyroglobulin (to form monoiodothyroglobulin (MIG) or di-iodothyroglobulin (DIG)).
- Coupling
  - MIG + DIG = T<sub>3</sub> – t-half = 24 hrs
  - DIG + DIG = T<sub>4</sub> – t-half = 7 days.
  - T<sub>3</sub> is the active form.
  - Peripherally T<sub>4</sub> is converted to T<sub>3</sub>.

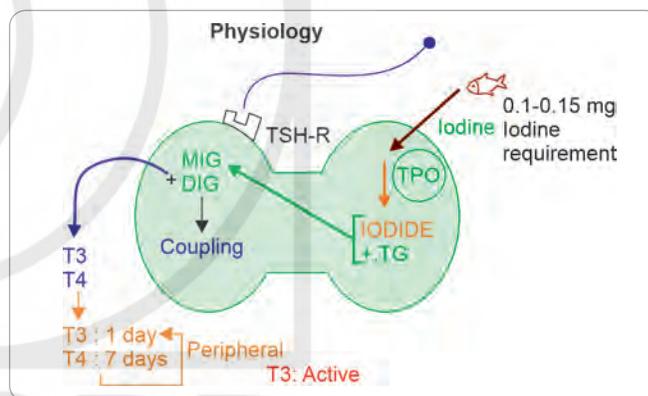


Figure 4: Physiology of Thyroid

### Diseases Related to Physiology

- Deficiency of iodine: M/C cause of hypothyroidism in the world
- **Congenital thyroid peroxidase deficiency: Pendred syndrome**
  - Sensory Neural Hearing Loss
  - Congenital Hypothyroidism
- **Hashimoto thyroiditis:** inhibitory antibody against
  - TPO – MCC
  - Thyroglobulin
  - TSH-R
  - MCC of Hypothyroidism in Western Countries\*\*
- **Graves' Disease:**
  - Stimulatory antibody to TPO, TG and TSH- R which results in increased T<sub>3</sub> and T<sub>4</sub> production



### MUST KNOW

- **Delphic nodes**- They are pretracheal nodes and Prelaryngeal nodes (Bailey mentions Pretracheal nodes as Delphic Nodes)
- **Lateral aberrant thyroid**- It is a metastatic node from a nonpalpable papillary cancer in thyroid. The name is a misnomer.
- **Ectopic thyroid**- M/C site is Lingual thyroid. Other sites are Esophagus, Trachea, Mediastinum, Aortic arch.
- **Lingual thyroid**- failure of median anlage to descend downward. Presents as rounded swelling in the back of tongue at foramen cecum. It may cause dysphagia and speech problems. This is the only thyroid tissue and hence surgical excision must not be done. Only medical treatment using suppressive doses of TSH and RAI is used to reduce the size if causing obstructive symptoms.
- **Struma Ovarii**- Benign Ovarian tumor containing Thyroid Elements. It's a type of teratoma solid in nature and sometimes may even cause thyrotoxicosis. Mostly benign.
- **Scabard Trachea**- Lateral compression of trachea due to long-standing goiters or malignancy

## TOPIC 2: INVESTIGATIONS RELATED TO THYROID SWELLING

- **Thyroid Function Tests**
    - Free T3- 3-9 micromol/L
    - Free T4 – 8-24 nmol/L
    - TSH - <3 mU/L
    - TPO Value- >25 U/mL
    - Anti-TG >1:100
  - **Hypothyroidism**
    - Free T3- N/ decreased
    - Free T4- N/ decreased
    - **TSH- increased**
  - **Hyper thyroidism**
    - **TSH- Decreased**
    - FT3 – N/ increased
    - FT4- N/ increased
  - Most sensitive IOC for hypo/hyperthyroidism- TSH value.
  - Subclinical cases- Free T3 is most sensitive.
  - **Refetoff syndrome** – **Increased T4** along with normal or increased TSH (usually TSH will decrease but here it is increased). Due to peripheral T4 resistance syndrome.
- **IDL scopy:**
    - 3% patients have occult vocal cord paralysis
    - Document for medicolegal purpose
  - **Radio-Active Iodine Uptake (RAIU) Study:**
    - **Mixed with milk and taken orally**
      - ◆  $I^{131}$  :  $t_{1/2}$  - 8 days
      - ◆  $I^{123}$  :  $t_{1/2}$  - 12-14 hrs
      - ◆  $I^{132}$  :  $t_{1/2}$  - 2.5 hrs
      - ◆  $Tc^{99m}$  :  $t_{1/2}$  - 6 hrs
    - Gland traps RAI and emits beta radiation.- used for diagnostic and therapeutic purposes.
    - Caught on Gamma cameras- to see for uptake- called **Thyroid scan**.

### Other Investigations

- **USG – neck:**
  - Helps to identify if it is thyroid/not
  - Consistency (solid/cystic)
  - Lymph node

### TIRADS- grading system (Thyroid Imaging Reporting and Data System)

- Composition of gland and tumor
- Echogenicity
- Size
- Echogenic foci
- Margin
- **FNAC/ FNNAC (FINE NEEDLE- NONASPIRATION CYTOLOGY)**
  - FNNAC- Tissue is collected in needle hub (no negative pressure created)
  - After that take gas in syringe and push it on glass slide
  - USG guidance is advised for accurate sampling and reduction of unsatisfactory aspirates.



### Extra Edge

#### FNAC

- Appropriate FNAC specimen must contain- 6 Follicular cell Group containing 10 cells each\*\*
- Bethesda criteria is used for reporting Thyroid cytopathology, 6 criteria are used:
  1. Nondiagnostic/unsatisfactory- Image-guided FNA
  2. Benign-Clinical follow-up
  3. Atypia of Undetermined significance (AUS) and Follicular lesion of Undetermined significance (FLUS)- Repeat FNA/ Lobectomy
  4. Follicular neoplasm or Suspicious of Follicular neoplasm- Lobectomy
  5. Suspicious of malignancy- Lobectomy or Total thyroidectomy
  6. Malignancy – Total thyroidectomy advised

# Rectum and Anus

(Based on Bailey and Love's 27<sup>th</sup> Edition—Chapters 73 and 74)

## Basic Anatomy

- Rectum is 12-15 cm length
- 3 Houston valves:
  - Left side: upper and lower are present
  - Right side: Middle is seen
- Puborectalis muscle is seen at anorectal junction
- Anus is 4 cm
- Upper 1/3rd rectum is fully intraperitoneal
- Middle 1/3rd anterior part is intraperitoneal
- Lower 1/3rd is fully extraperitoneal

## Anal Anatomy

- Divided into parts based on Dentate line (Pectinate line)
- Above the line is columnar epithelium
- Below the line is squamous epithelium

Above pectinate line	Below pectinate line
Embryology- derived from primitive anorectal canal	Derived from proctodeum**
Lymphatic drainage- Internal iliac nodes	Superficial inguinal nodes
Autonomic nerve supply	Somatic – Inferior rectal nerves
Artery – Superior rectal artery	Inferior rectal artery
Pathology in this zone is painless	Pathology in this zone is painful

## Muscles around the Anus:

- Circular muscle of rectum continues as Internal sphincter of anus.
- Internal sphincter is involuntary control and maintains the resting pressure of anus\*\*
- Three parts of External sphincter- Deep, Superficial and Subcutaneous parts.
- Ischioanal fossa is seen outside the External sphincter

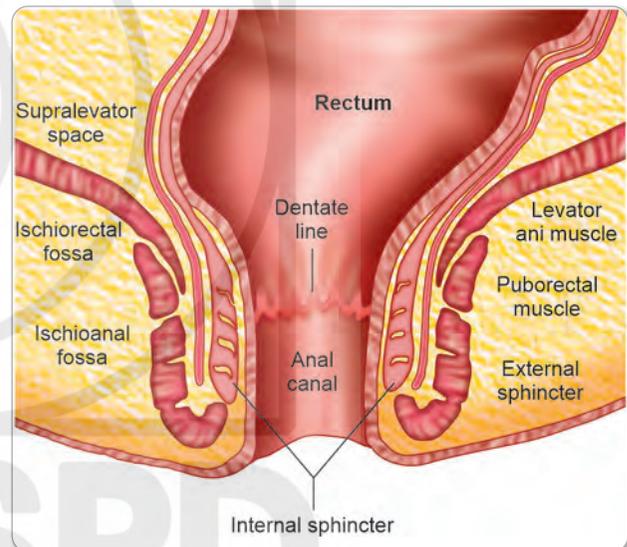


Figure 2: Muscles around anus

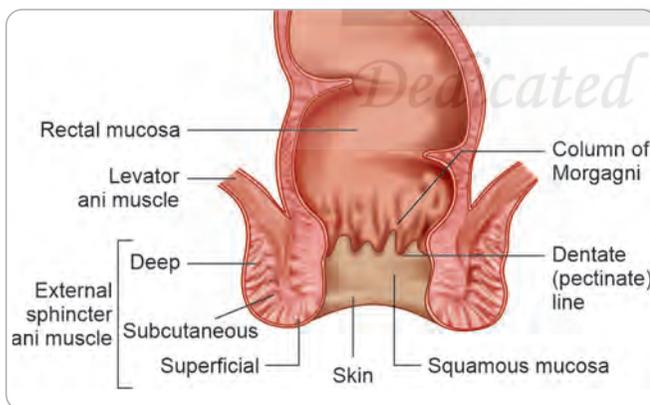


Figure 1: Anal anatomy

## Extra Edge

### Rectal Fascia Anatomy:

- The rectum is encircled by Fascia propria all around the wall, this is the investing fascia of rectum.
- Presacral fascia is seen covering the vertebra. Beneath the presacral fascia venous plexus is seen enormously.
- The Rectosacral fascia, or Waldeyer fascia, is a thick condensation of endopelvic fascia connecting the presacral fascia to the fascia propria at the level of S4 that extends to the anorectal ring.
- Waldeyer fascia is an important surgical landmark, and its division during dissection from an abdominal approach provides entry to the deep retrorectal pelvis.
- Anteriorly the Bladder and prostate are separated from Rectum by a Denonvilliers' fascia.

Contd...

## Surgical Techniques

- Miliigan-Morgan operation- Open Hemorrhoidectomy – removal of hemorrhoids at 3, 7 and 11 o' clock positions. After the surgery "anus looks like a clover the problem is over" - it means there won't be future stricture.
- Ferguson operation-Closed hemorrhoidectomy\*

## Newer Operations

- Longo procedure (Using Circular stapler)
- HALO- Hemorrhoidal artery ligation operation
- THD- Transanal hemorrhoidal dearterialization

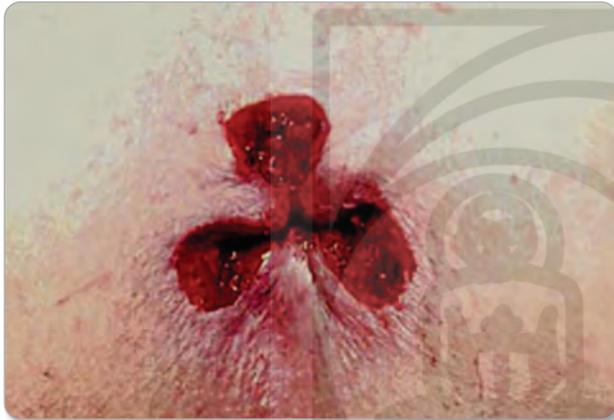


Figure 5: Milligan Morgan operation – Clover shape anus

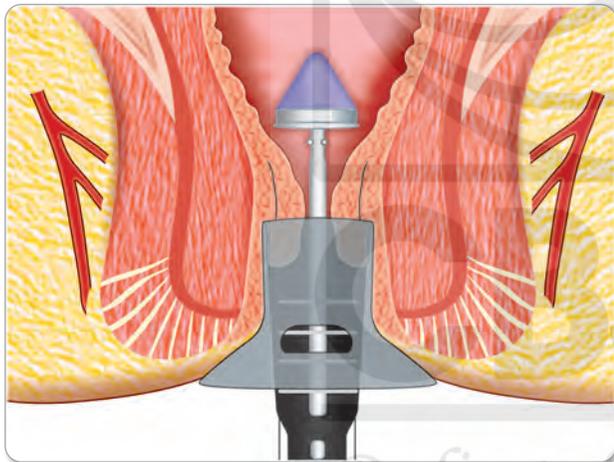


Figure 6: Longo procedure

## TOPIC 2: FISSURE IN ANO

- It's a tear in anal mucosa which is pain sensitive
- Most Common (MC) in 6 o' clock
- In pregnancy - 12 o' clock
- In Crohn's - Lateral positions
- C/F - Severe painful defecation with spasm and bleeding P/R
- Sentinel tag - Protective tag presents in chronic fissure.



Figure 7: Posterior fissure in ano

## Management

- Conservative: Laxatives, Glyceril trinitrate ointment local application, Diltiazem Application, Sitz bath
- Surgical treatment of choice- Lateral Sphincterotomy\*\* - Internal sphincter cut at lateral position (3/9 o' Clock position)- Notaro's Operation

## TOPIC 3: FISTULA IN ANO

- Communication of Anal epithelium with Perianal skin
- M/C cause is Cryptoglandular abscess\*
- As medicos you must be able to differentiate Fistulas from Pilonidal sinus
- Fistulas will have communication with anal canal and lie close to anus, Pilonidal sinus lies in Gluteal cleft and has no connection to anus.



Figure 8: Showing multiple fistula in ano at 7, 10 and 11 o' clock positions

## Multiple Choice Questions

## INI-CET QUESTION

1. The following are the perineal procedures; except:  
(INI-CET May 2022)
- Thiersch
  - Altemeier operation
  - Delorme
  - Ripstein

## NEET PG NEW PATTERN QUESTIONS

2. An Ola cab driver presented with a chronic discharging sinus with draining pus near the anal area as shown in the image. What is your diagnosis?  
(NEET PG 2022)



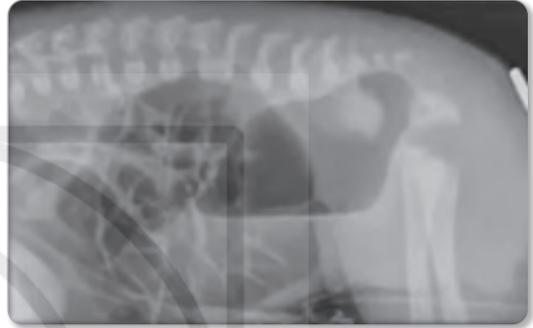
- Anorectal fistula
  - Pilonidal sinus
  - Furuncle
  - Anal Fissures
3. What surgery is shown here in the image? (NEET PG 2021)



- Thiersch wiring
- Altemeier procedure
- Hemorrhoidectomy
- Well's operation

## FMGE QUESTIONS

4. Identify the pathology in the newborn baby as shown in the image:  
(FMGE June 2022)



- Meningocele
  - Congenital mega colon
  - Imperforate anus
  - Pyloric stenosis
5. Best treatment strategy for Anal cancer:  
(FMGE 2019)
- Chemoradiation
  - Surgery
  - Radiation
  - Chemotherapy
6. A male patient presents with itching in perianal region with soakage of his undergarment with purulent discharge. Identify this condition:  
(FMGE December 2020)



- Pilonidal sinus
  - Prolapse
  - Perianal fistula
  - Haemorrhoids
7. Identify this image:  
(FMGE December 2020)



- Perianal abscess
- Pilonidal sinus
- Hemorrhoids
- Fissure in ano

## Answers with Explanations

### 1. Ans. (d) **Ripstein**

(Ref: Sabiston 21<sup>st</sup> edition page 1395)

Perineal approach	Abdominal approach
<ul style="list-style-type: none"> <li>• Delorme's mucosectomy operation of removal of rectal mucosa and plicating the muscle layer*</li> <li>• Thiersch anal encirclement operation</li> <li>• Altmeier's perineal recto-sigmoidectomy procedure with Coloanal anastomosis*- Resection procedure**</li> </ul>	<ul style="list-style-type: none"> <li>• Ripstein's anterior rectopexy</li> <li>• Well's posterior rectopexy</li> <li>• Resection rectopexy (Frykman and Goldberg) for redundant sigmoid colon</li> <li>• Anterior resection</li> </ul>

### 2. Ans. (b) **Pilonidal sinus**

(Ref: Bailey and Love 27<sup>th</sup> edition page 1348)

- If at all the image shows gluteal cleft area with too much of hair, think of pilonidal sinus especially if the history of Jeep driver is mentioned.

### 3. Ans. (a) **Thiersch wiring**

(Ref: Sabiston 21<sup>st</sup> edition page 1395)

- Thiersch wiring is an anal encirclement operation that prevents rectum prolapsing down and less commonly done now.
- It is done in extremes of age and has high recurrence rate

### 4. Ans. (c) **Imperforate Anus**

(Ref: Bailey and Love 27<sup>th</sup> edition page 137)

- This is the image of Invertogram- in which imperforate anus cases distal opening of the colon is found.
- No contrast is used, the swallowed gas of the baby reaches the distal colon and the gas acts as a contrast.
- The test is done usually after 24 hours.

### 5. Ans. (a) **Chemoradiation**

- The regimen used for Anal canal cancer is Nigro regimen
- Chemoradiation- 5FU + Mitomycin chemotherapy + Radiotherapy is used for Anal SCC.

### 6. Ans. (c) **Perianal fistula**

- Note the opening seen away from midline in the anus and hence this is perianal fistula

### 7. Ans. (a) **Perianal abscess**

- Perianal abscess is due to infection of crypt glands and that opens to the skin
- The abscess needs to be drained immediately with cruciate incision

### 8. Ans. (b) **Flexible sigmoidoscopy and biopsy**

- For cancer rectum, the immediate next step should be to confirm it by doing a Proctoscopy/ sigmoidoscopy and take a biopsy
- Definitely he has to undergo full colonoscopy before surgery to rule out any synchronous cancers before surgery,

### 9. Ans. (a) **Crypt at dentate line**

- Anal crypts of Morgagni are seen in Dentate line.
- They have glands which infected cause Cryptoglandular abscess.
- The cryptoglandular abscess ruptures outside resulting in Fistula.
- M/C cause of Fistula in ano is Cryptoglandular abscess

### 10. Ans. (c) **Chemoradiation Nigro regimen**

#### Explanation:

- Nigro was the first to promote radiation therapy with chemotherapy as definitive treatment for squamous cell cancers of the anal canal.
- The current protocol includes infusional 5-FU with mitomycin C and external beam radiation to the pelvis with a minimum dose of 45 Gy. The inguinal nodes, pelvis, anus, and perineum should be included in the radiation fields.
- Patients with advanced and residual disease after 45 Gy, or node-positive disease are usually treated with an additional 9 to 14 Gy for a total dose of 54 to 59 Gy.

### 11. Ans. (c) **Cruciate incision**

(Ref: Bailey and Love 27<sup>th</sup> edition page 1363)

- Perianal and Ischiorectal abscesses are drained by Cruciate incision.
- After cruciate incision, excision of skin edges done to derroof the abscess
- Send the Pus for Culture and sensitivity\*
- Always look for a potential problem like Diabetes, Crohn's, TB, etc.

### 12. Ans. (d) **Fissure**

(Ref: Bailey and Love page 117)

#### Explanation:

- M/C cause of Bleeding per rectum on passing motion is Fissure in ano\*

### 13. Ans. (a) **C1**

Though there were lots of named Colonic Cancer staging used... All are replaced by only TNM staging now. For exam point of view, we still read those outdated stagings.

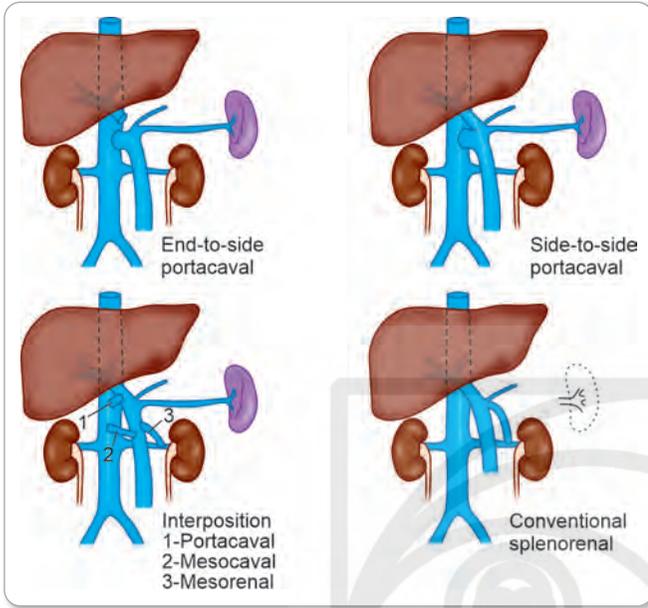


Figure 10: Nonselective shunts

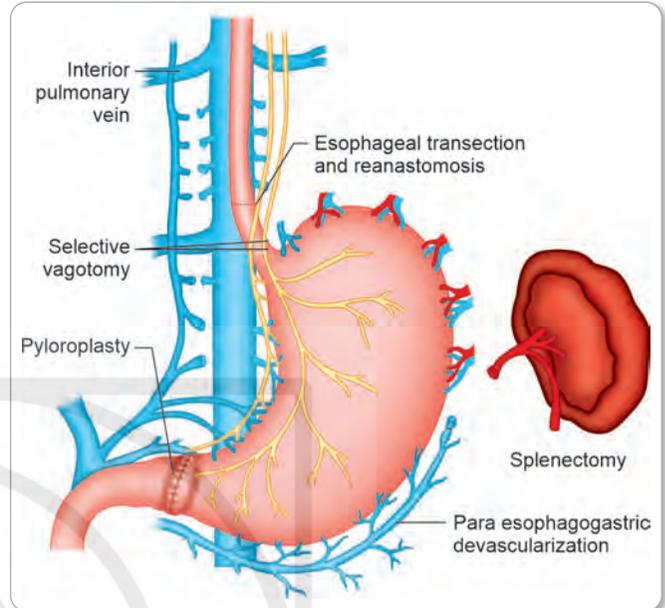


Figure 12: Sugiura operation

Final resort in all cases of PHT= Liver transplant

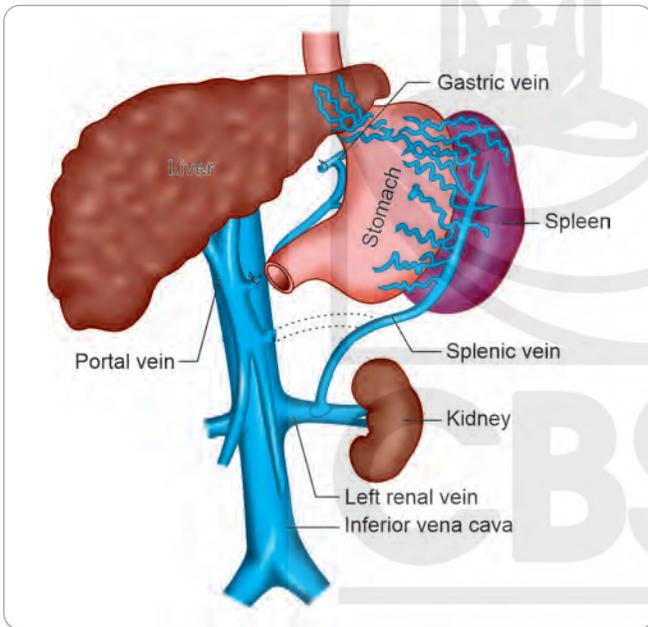


Figure 11: DSRs Shunt

**Protocol for Variceal Bleeding**

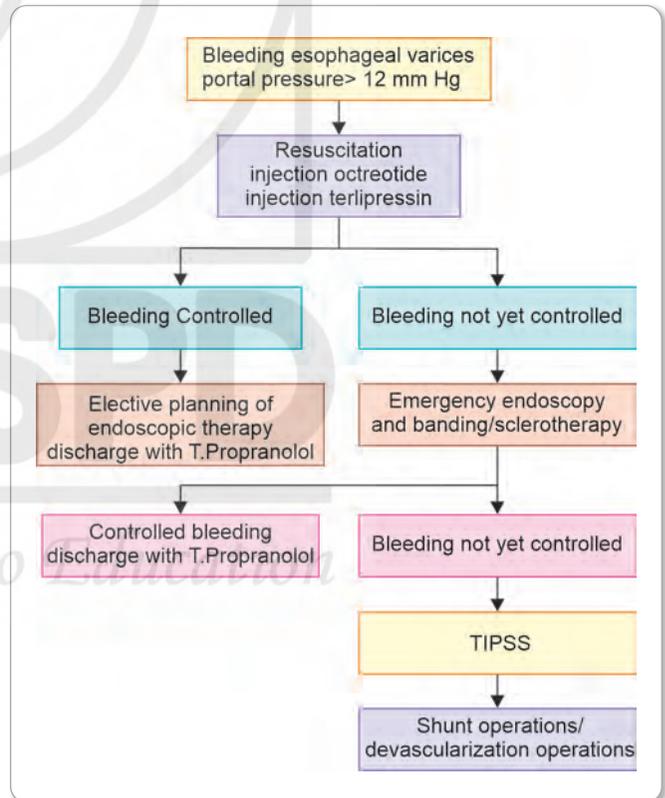


Figure 13: Variceal bleed in nutshell

**6th Step: If Shunt Operations not Possible: Devascularization Operations**

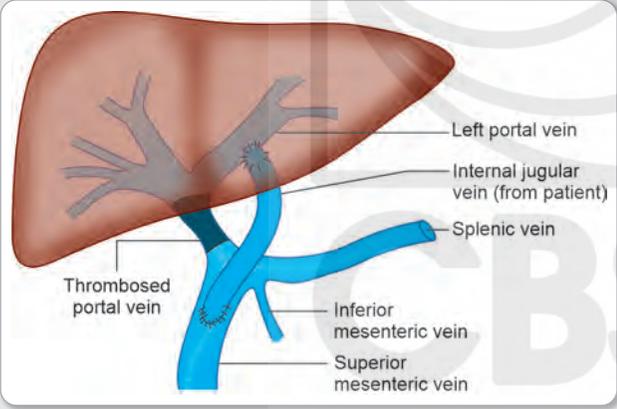
**Sugiura Operation**

- Ligation of veins near esophagus
- Vagotomy
- Pyloroplasty
- Esophageal transection and anastomosis
- Splenectomy

## VARIOUS CAUSES OF PORTAL HYPERTENSION

### Sinistral/Left Portal Hypertension

- There is a splenic vein thrombosis due to Chronic pancreatitis
- Hence Short gastric vessels dilate and develop only left side PHT with Isolated gastric varices + Splenomegaly\*\*
- Treatment of Choice- Splenectomy.

Noncirrhotic portal fibrosis (NCPF)	Extrahepatic PV obstruction (EHPVO)
2nd and 3rd order of PV branches are fibrosed	Main or 1st order portal vein obstructed
M/C in age 20-40 years	M/C in < 10 years Hence stunted growth seen
<b>Common features:</b>	
<ul style="list-style-type: none"> <li>• Esophagogastric varices rupture and hematemesis (M/C presentation)</li> <li>• Splenomegaly (More bigger in NCPF)</li> <li>• Liver histology is normal</li> <li>• LFT is normal</li> <li>• <b>No ascites**</b></li> </ul>	
<b>Treatment:</b>	
<ul style="list-style-type: none"> <li>• <b>Splenectomy + Proximal Splenorenal shunt (Linton)</b></li> <li>• <b>They don't develop encephalopathy as their liver is normal</b></li> <li>• <b>REX shunt</b>- most physiological shunt done for EHPVO between SMV to Left portal vein using IJV of the baby.</li> </ul>	
 <p style="text-align: center;"><b>REX shunt for EHPVO</b></p>	

### Postsinusoidal Causes of Portal Hypertension- VOD Vs BCS

#### Veno-occlusive Disease

- Sublobular venules get thrombosis
- M/C etiology: Follows bone marrow transplant

- Others- Pyrrolizidine alkaloids (PAs), Azathioprine
- DOC - Defibrotide
- Venography shows HV and IVC normal; Wedge HV pressure is increased.

#### Budd-Chiari Syndrome

- **Two causes- HV thrombosis and IVC occlusion by Congenital membranous webs**
- BCS- M/C cause in Western is HV thrombosis\*\* - The thrombosis M/C due to **Polycythemia Rubra vera\*\***
- BCS - M/C cause in Asians/ Indians is IVC webs
- IOC to diagnose- Hepatic Venography is gold standard- **SPIDER WEB appearance\*\***
- CECT abdomen- shows Enlarged Caudate Lobe - **HOT SPOT of caudate lobe seen**

#### Management

- No role of Thrombolytic agents as it is a well formed thrombus.
- Liver is normal - Shunt operations are planned as shown below:
- Liver failure cases- Liver transplant is TOC

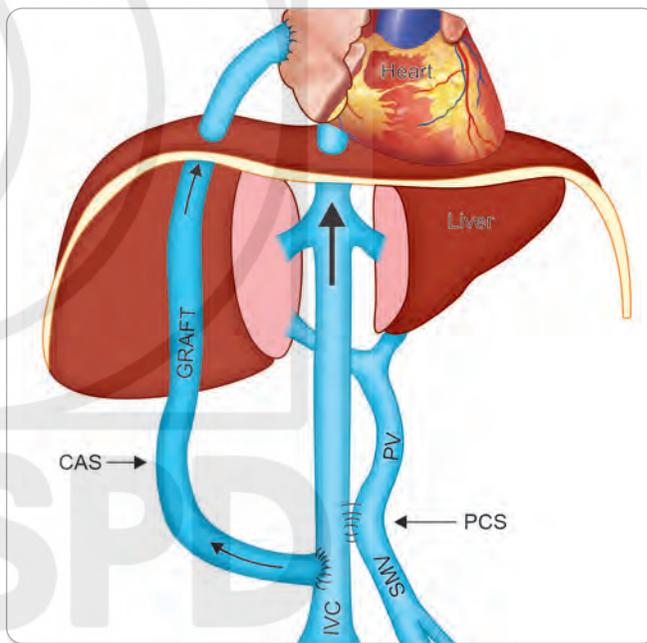


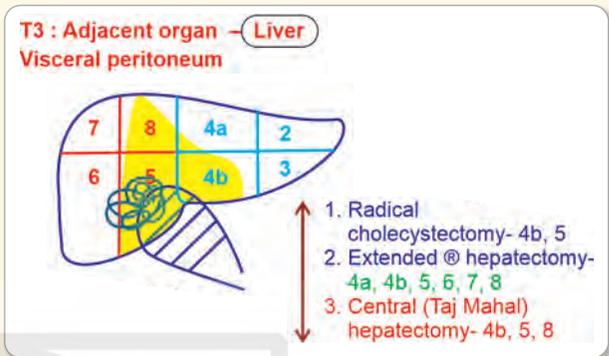
Figure 14: Shunt operations in BCS

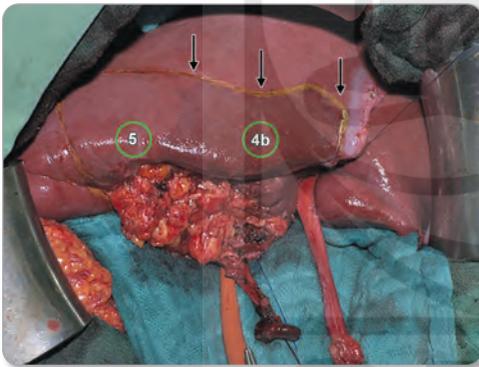
#### Shunt Operations

- HV thrombosis- Side-to-side Portcaval shunt (SSPCS) done
- IVC webs- Double shunt operation done (SSPCS+ cavoatrial shunt) or SSPCS with IVC stenting

#### Clinical method to find - HV thrombosis alone or IVC web?

- Yes we can find out seeing the Multiple collaterals running from below upward in IVC obstruction cases.

TNM Staging	Procedure
<p><b>T3-</b> Serosal Perforation and/or Direct invasion of the Liver or any other single extrahepatic organ</p>	<p><b>T3 : Adjacent organ – Liver</b> <b>Visceral peritoneum</b></p>  <p><b>Options:</b></p> <ul style="list-style-type: none"> <li>• Radical Cholecystectomy- 4b+5</li> <li>• Extended Right hepatectomy- 4a+4b+ 5,6,7,8</li> <li>• Central (Taj Mahal) hepatectomy- 4b+5+8</li> </ul>
<p><b>T4-</b> Invades main PV or HA or two or more extrahepatic organs.</p> <ul style="list-style-type: none"> <li>• <b>N1-</b> Metastasis in 1-3 regional nodes – Pericholedochal nodes (CD, CBD, HA and PV)</li> <li>• <b>N2-</b> Metastasis in 4 or more regional nodes- Distant nodes (Periaortic, pericaaval, SMA and Celiac nodes)</li> <li>• <b>M1-</b> Distant mets</li> </ul>	<p><b>Inoperable cancer</b></p>



**Figure 30:** Radical cholecystectomy for Cancer Gallbladder

### Extra Mile

- Median Survival of Unresectable cases- 2-4 months only\*
- Gemcitabine+ Cisplatin is used for Unresectable cases.



*Bailey's and Love 27<sup>th</sup> Edition*

#### Latest updates:

- Port Site Excision is not having any potential therapeutic benefit and not done nowadays.
- It is rare for port site alone to have recurrence. If there is a recurrence it will be generalized.
- So now it is not recommended to excise the port sites during re-resection.
- If already diagnosed as GB cancer and planning a radical surgery- one investigation that must be done now is D.Lap. In around 30% cases, there are small peritoneal deposits or liver mets. D.Lap is a staging investigation

*Sabiston says- Port sites to be excised (But Blumgart says no need to do port site excision)*

*Bailey says- Routine port site excision is not performed (Page 1117)*

*Author's vote is for non excision of port\**

### Scenario 1: Incidental GB Cancer in Specimen

- Lap cholecystectomy done for Multiple GB stones.
- Pathologist is telling there is a cancer in the specimen.

What next?

- The further management depends on staging:
  - T1a- Already done Lap cholecystectomy is enough
  - T1b- If everything is negative (PNI, LN, Margins)- Lap cholecystectomy is enough
  - T1b- If any of the above positive- Reopen and do Extended Cholecystectomy
  - T2- Reopen and do Radical Cholecystectomy
  - **T3 and T4 will not be seen in Incidental as we can see the growth on putting the laparoscopy itself.**

### Scenario 2: On Lap Cholecystectomy 1<sup>st</sup> Port you are seeing a Cancer in GB

- **Unexperienced surgeon-** Remove the port and refer to Hepatobiliary surgery
- **Hepatobiliary surgeon-** Convert to open and proceed with radical surgery

#### Adjuvant therapy:

- Gemcitabine therapy is given

Contd...

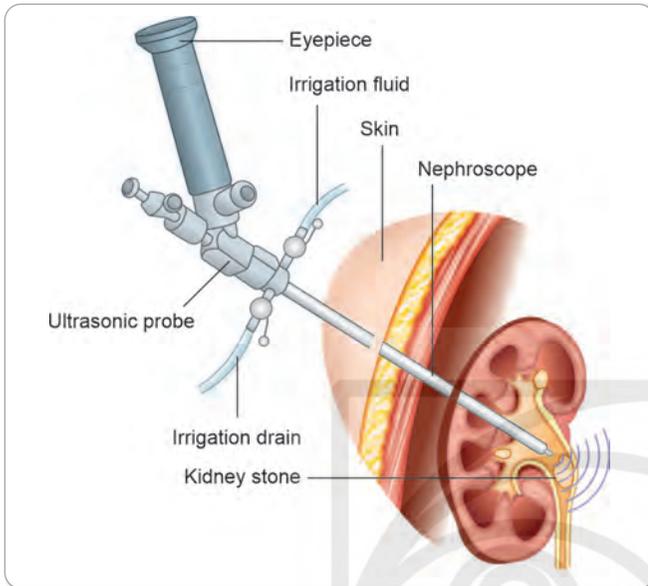


Figure 7: PCNL



Figure 8: Nephroscope used for PCNL

### Complications

- Bleeding
- Sepsis
- Perforation of bowel
- Trans costal approach- Pleural injury and Hydrothorax can happen
- Subcostal approach- Duodenal injury, Colon injury and Liver and spleen injury
- Injury to renal artery/vein/IVC\*\*

### Staghorn Stone

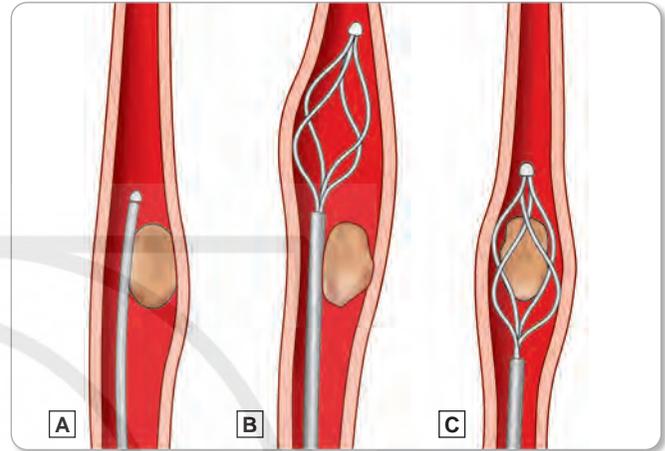
- Sandwich technique- ESWL followed by PCNL
- If this technique is not mentioned – go with PCNL\*\*

### RIRS

- For renal pelvis stone
- For mobile stone
- By retrograde method, we use ureteroscopy to remove intra renal stones.

### Management of Ureteric stones

- <5mm - it will pass
- >5mm/impacted somewhere- Removed by Dormia basket technique



Figures 9A to C: Dormia Basket removal

- For upper ureteric stone- **PUSH BANG technique\*\*** we push the upper ureteric stone back into the renal pelvis by Ureteroscope and break the stone by ESWL\*\*

### Bladder Stone

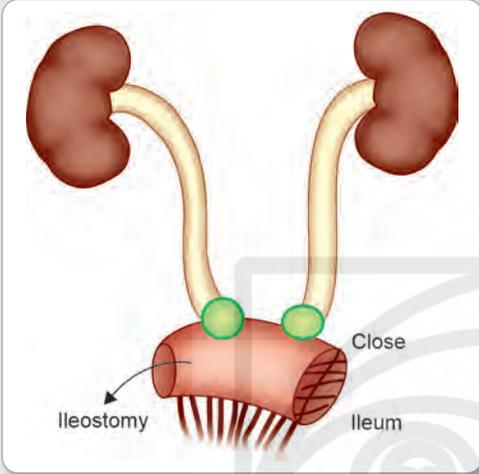
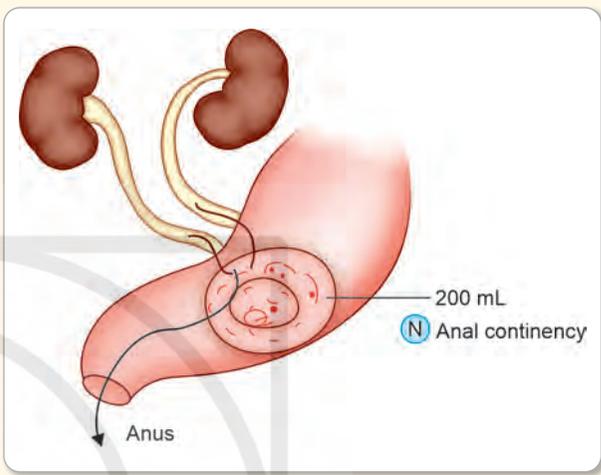
- Old technique- Open Cysto lithotomy
- Latest- Transurethral Cysto lithotripsy
- Lasers used now- HO:YAG(best) Nd:YAG

### IMAGE BASED QUESTION

- The image shown below is asked in AIIMS- please note the Double J stent in right Ureter\*\*
- The left kidney is having a Percutaneous DJ stent-for percutaneous nephrostomy\*\*



Right Ureteric Stent and left Percutaneous stent\*\*

Ileal conduit	Colon Conduit
<ul style="list-style-type: none"> <li>• M/C type</li> <li>• M/C complication- ureteroileal stricture</li> </ul> 	<ul style="list-style-type: none"> <li>• Drained into Sigmoid colon</li> <li>• M/C complication- infection</li> <li>• Risk of malignancy++</li> </ul> 
<ul style="list-style-type: none"> <li>• Important prerequisite for this procedure- <b>Patient must be able to hold 200 mL saline in Rectum with continence</b></li> </ul>	

- Neobladder can also be created if urethra is not involved using ileum.
- Continent Urinary diversion procedure – Kock's Ileostomy (Ileum made like a valve)
- **Mitrofanoff procedure**- Appendix can be used as a drainage of urine procedure from Bladder.

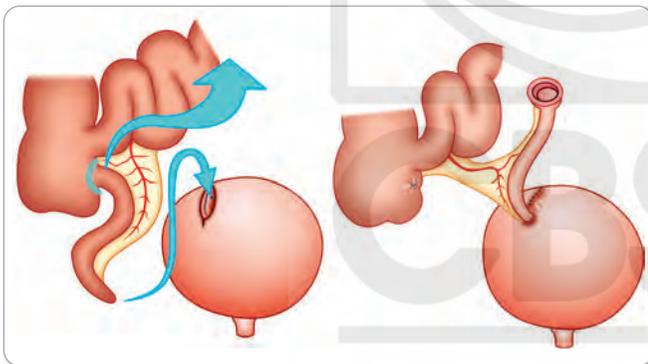


Figure 4: Mitrofanoff procedure

### Conduit Associated Metabolic Problems

- Ileal - metabolic acidosis + hyperchloremia
- Jejunum- metabolic acidosis + **hypochloremia\*\***
- Colon- metabolic acidosis + hyperchloremia
- Stomach- **Metabolic alkalosis\*\*** + hyperchloremia- **Stomach conduit is used in Renal failure patients\*\***

### Management of the Above Problems

- IV Saline +  $\text{NaHCO}_3$
- Oral [potassium citrate +  $\text{NaHCO}_3$ ] – Three times daily

### Chemotherapy

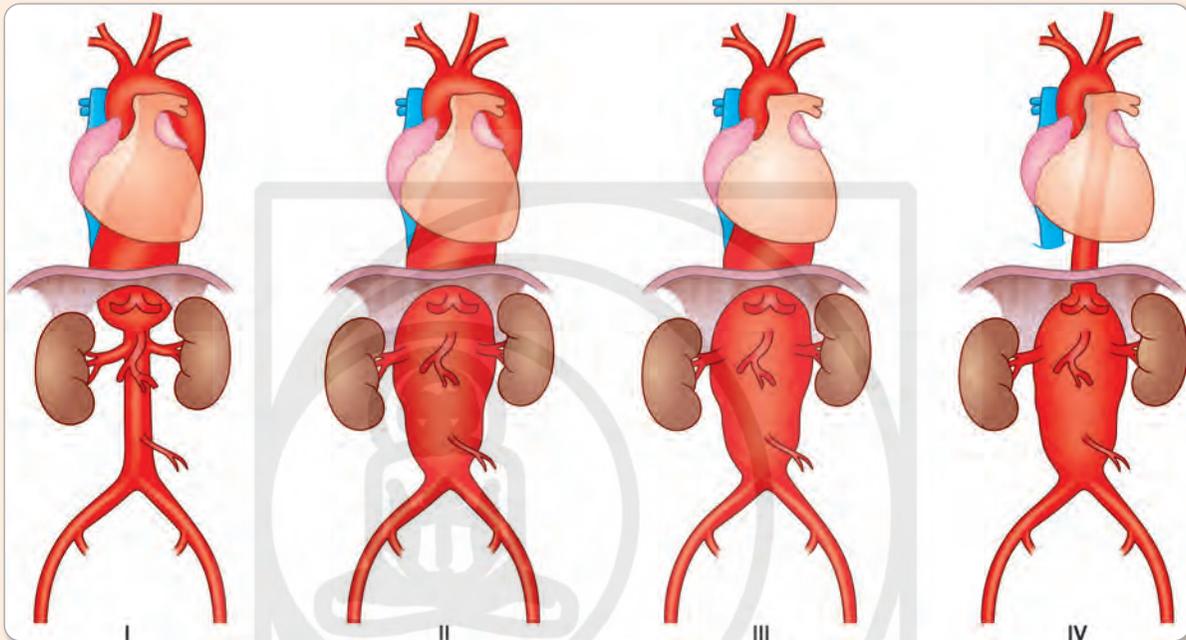
- Indicated in  $\geq T3a$ , LN positive, Margin +ve
- GC regimen- Gemcitabine + Cisplatin
- MVAC regimen (Old)- Methotrexate + Vinblastin + Actinomycin+ Cisplatin
- Postoperative RT is not useful

## TOPIC 5: BLADDER AND URETHRAL INJURIES

Intraperitoneal Rupture of Bladder	Extraperitoneal Rupture of Bladder
<ul style="list-style-type: none"> <li>• M/C due to direct blow in Dome of bladder</li> <li>• Cause uremic peritonitis</li> <li>• Immediate surgery needed</li> </ul>	<ul style="list-style-type: none"> <li>• Cause - fracture of pelvis**</li> <li>• Superficial extravasation of urine with urine extravasated from nipple level to Holden's line level</li> <li>• Catheter inserted immediately</li> <li>• Wait and watch- gradually the injury heals</li> </ul>

## CRAWFORD CLASSIFICATION OF THORACO-ABDOMINAL AORTIC ANEURYSM

- **Type I:** from Lt subclavian artery up to renal artery
- **Type II:** from Lt subclavian artery up to bifurcation of aorta (**largest\*\***)
- **Type III:** from middle of descending aorta up to bifurcation of aorta
- **Type IV:** it involves suprarenal aorta +/- renal artery (Not present inside thorax)



### Popliteal Artery Aneurysm

- It is the M/C peripheral artery aneurysm
- 2/3rd of times bilateral
- Can wait up to 25 mm (>25 mm surgery)
- Distal occlusion (due to thrombus or embolus formation)

### Mycotic Aneurysm

- Caused by *Staphylococcus*
- Site : Femoral artery
- False aneurysm

### Seldinger Technique

- Cannulate the artery in retrograde way using Seldinger needle
- Pass the guide wire distal to the block
- Through guide wire a balloon (Fogarty balloon catheter) is passed distal to block, balloon is inflated and withdrawn
- Through a small incision the embolus is removed

## TOPIC 2: ACUTE LIMB ISCHEMIA

### ACUTE LIMB ISCHEMIA

- M/C cause: embolus that comes from Lt atrial thrombus
- Clinical features: 6P
  - Pain
  - Paresthesia
  - Pulselessness
  - Poikilothermia
  - Paralysis of limb
  - Pallor
- It is an emergency: **do embolectomy in 4-6 hours**

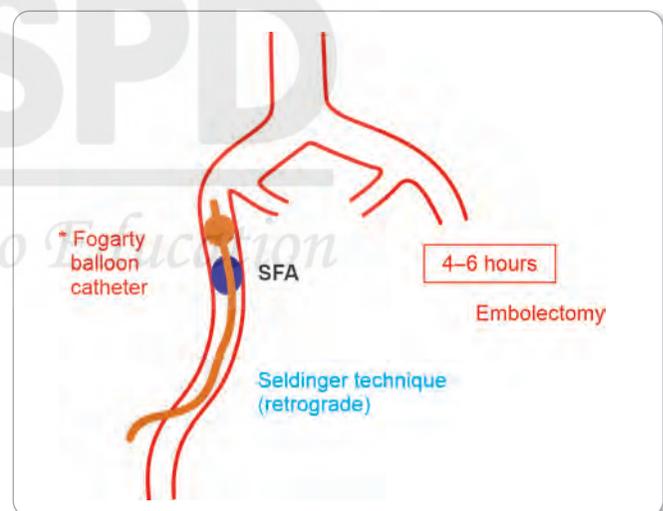


Figure 4: Seldinger technique



Figure 8: AV fistula

**NICOLDANI / BRANHAM'S SIGN: On Compressing Proximal to Fistula**

- Murmur disappears
- Swelling decreases
- Thrill absent
- Pulse rate decreases

**TOPIC 5: RAYNAUD'S DISEASE**

- Due to unknown cause
- If it happens due to Scleroderma, SLE, it is called Raynaud's phenomenon
- Vasospasm is due to:
  - Cold exposure
  - Continuous vibrations

**Phenomenon seen:**

**W-B-C:** Initially limb color is White later Blue and then Crimson red

- White: due to spasm of both arteries and veins
- Blue (cyanotic phase): Here arteries are still in spasm and veins and capillaries open
- Crimson red: Arteries open in an extensive way, veins already in opened state

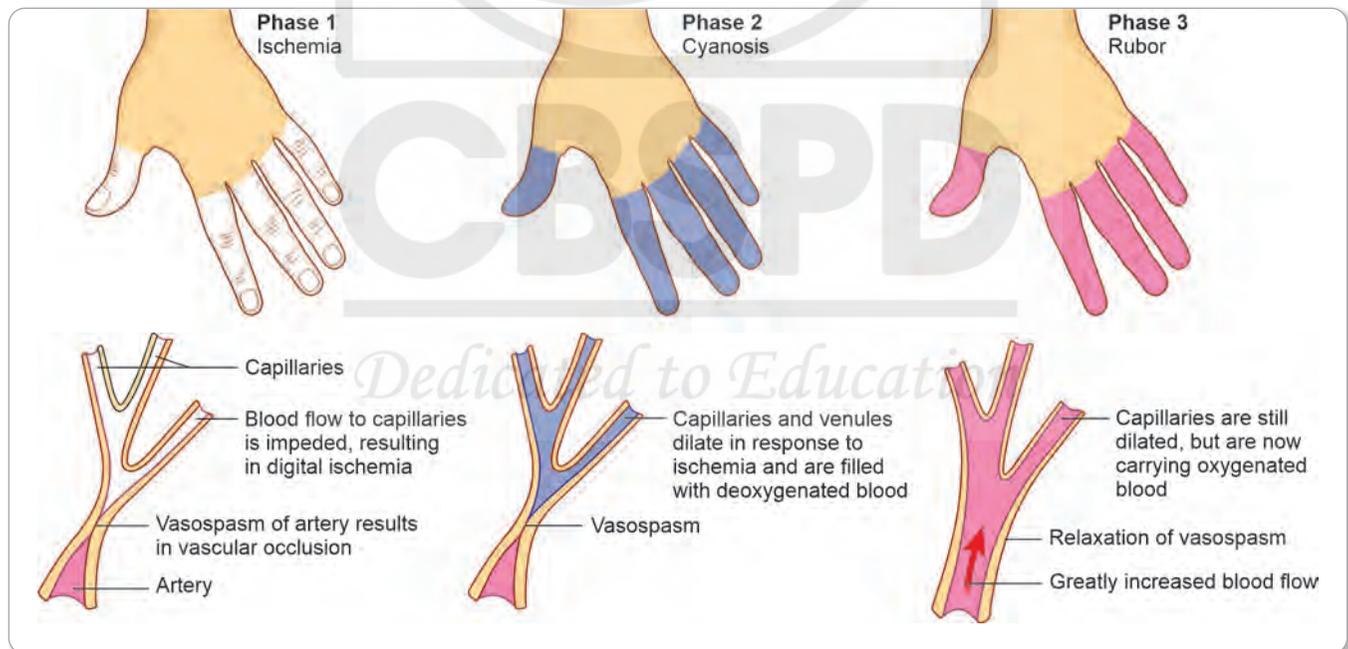


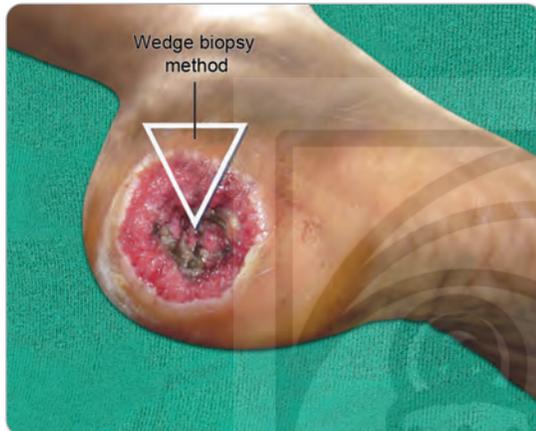
Figure 9: Mechanisms in Raynaud

## Multiple Choice Questions

## INI-CET QUESTIONS

1. A deep ulcer in the heel of a patient given:

(INI-CET May 2022)



- Positive Trendelenburg test.
  - Absent distal pulses
  - Decreased sensation
  - Pain on passive movement of calf muscles
2. A 40-year-old male a known case of varicose vein, on examination eczema and lipodermatosclerosis was found. It comes under \_\_\_\_ of CEAP classification system:  
(INI-CET November 2020)
- C1
  - C2
  - C3
  - C4
3. Which of the following is correct related to the image given below?  
(INI-CET November 2020)



- Peripheral neuropathy
  - Distal pulses not palpable
  - Restriction in movement of toes
  - Diabetes mellitus
- 1, 2 and 3
  - 1 and 4
  - 1, 3, 4
  - 1, 2, 3 and 4

4. A 35-year-old male, chronic smoker came to OPD with right calf muscle pain and ulcer over the great toe with surrounding Black pigmentation. What is the next investigation you do to this patient?  
(INI-CET November 2020)

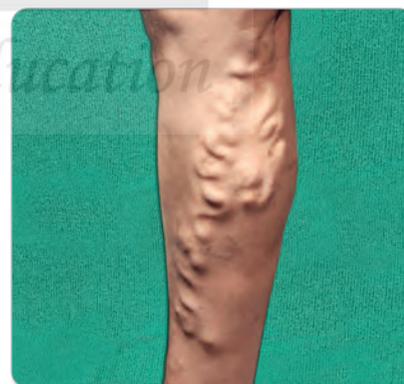
- CT angiography
- Digital subtraction angiography
- MR angiography
- Duplex scan of lower limb vessels

## NEET PG NEW PATTERN QUESTIONS

5. A male patient presented with Bilateral toe gangrene with amputated digits and leg claudication. H/o impotence is seen. Where is the site of occlusion seeing the image shown below?  
(NEET PG 2022)



- Aortoiliac
  - Bilateral internal iliac
  - Femoral
  - Popliteal
6. Following surgery for varicose veins, patient started complaining of numbness along the medial aspect of leg. Which nerve is most commonly affected?  
(NEET PG 2022)
- Superficial peroneal nerve
  - Deep peroneal nerve
  - Saphenous nerve
  - Sural nerve
7. A patient with no complaints presents with dilated veins. What is the CEAP staging for the image shown below?  
(NEET PG 2021)



- C2a
- C2b
- C3a
- C3b

25. An old lady, known case of Atrial fibrillation developed sudden arterial occlusive disease. Which of the following is having poorest prognosis? (FMGE June 2021)

- Pain
- Pallor
- Pulselessness
- Paralysis

26. A 25-year-old male, a chronic smoker, presents with pain in the finger with changes as shown in the image. Most likely pathology in this patient would be? (FMGE December 2021)



- Buerger's disease
- Raynaud's disease
- Acrocyanosis
- Ainhum

27. A patient was admitted for pelvic fracture is under treatment. He suddenly developed breathlessness and died on 3rd POD. What's the reason probably? (FMGE December 2021)

- Myocardial infarction
- Venous thromboembolism
- CVA
- Pleural effusion

28. A young male for whom both side L1 ganglion removed during Lumbar sympathectomy. What will be the side effect? (FMGE June 2021)

- Retrograde ejaculation
- Urinary disturbance
- Paralysis of lower limbs
- Erectile dysfunction

## NEW PATTERN CLINICAL QUESTIONS BY DR RRM

29. Mr Ramu, a 69-year-old male presented with severe claudication pain in both side of calf, thigh and buttock. On further history he is having sexual problems also. He is unable to walk even for 50 meters continuously and he takes rest before he restarts to walk. On examination, the Pulses are feeble in both side femoral arteries. Both Popliteal and Anterior tibial arteries are absent. What is the correct answer regarding this patient?

- This is a case of Buerger's disease
- This is a case of iliac occlusion on both sides due to thrombosis
- This is a case of Aortoiliac occlusion by a saddle-shaped thrombus
- Embolic disease in both lower limbs

30. A 25-year-old chronic smoker, Mr Kumar comes to vascular surgery OPD with severe pain in both calves on walking. He is unable to complete even 200 meters of walking. He started developing ulcer in both foot with discharge. His ABPI is 0.6 on measurement. He is normotensive. Which of the following is false?

- Buerger's exercises done
- Lumbar sympathectomy is beneficial for this patient
- Bypass procedures are ideal
- Lifestyle modification is very important

31. Mrs Kumari, 65 years female, known case of hypercholesterolemia and MI before 6 months, presents to you with claudication pain in left lower limb. You are examining the left lower limb- the left limb Femoral artery pulse is normal on both sides, whereas left Popliteal and anterior tibial are absent. ABPI is calculated with help of Handheld probe, shows left limb ABPI as 0.5, right lower limb 1. Which procedure indicated below is contraindicated?

- Percutaneous transluminal angioplasty
- Bypass of the thrombosed popliteal artery with saphenous vein reverse graft
- Femorotibial bypass with PTFE graft
- Femorotibial bypass with in situ saphenous vein using valvulome

32. Four-layer bandage used for Varicose ulcer management- the correct sequence from inside to outside is:

- Cotton- Cohesive- Elastic crepe bandage -Cotton crepe
- Cotton crepe- Cotton- Cohesive- Elastic crepe
- Cotton- Cotton crepe- Elastic crepe- Cohesive
- Cohesive- Cotton crepe- Cotton- Elastic crepe

## Answers with Explanations

### 1. Ans. (c) **Decreased sensation**

(Ref: *Short Cases in Surgery By Dr Rajamahendran*)

#### **Trophic Ulcer**

- It is due to impaired nutrition, blood supply and added neurological deficit.
- Important causes: diabetes, tabes dorsalis, leprosy, peripheral neuritis, etc.
- Also called neurotrophic/ neuropathic ulcer.
- Painless ulcer
- M/C location- pressure points like foot, back (bedsores), etc.
- Punched out
- Base formed by underlying bone
- Immobile

Venous ulcer will be seen over the medial malleolus.

Arterial ulcer will be seen on the dorsal aspect of foot.



**Venous ulcer**



**Arterial ulcer**

### 2. Ans. (d) **C4**

(Ref: *Bailey and Love 27<sup>th</sup> edition page 974*)

- C4b stands for Lipodermatosclerosis and Atrophie blanche

### 3. Ans. (d) **1, 2, 3 and 4**

(Ref: *Short cases in Surgery by Dr RRM*)

- This is a picture of trophic ulcer
- Multiple factors contribute to trophic ulcer like Neuropathy + Vasculopathy
- The major causes are – diabetes, leprosy, peripheral vascular disease, etc.
- The absence of pain perception and excess pressure results in such types of ulcers.
- Secondary infection may occur.

### 4. Ans. (d) **Duplex scan of lower limb vessels**

(Ref: *Bailey and Love 27<sup>th</sup> edition page 946*)

- The history given here is suggestive of Buerger's disease
- The next investigation is to do a Duplex scan to know the distal blood flow in lower limbs.
- IOC for atherosclerotic diseases is Digital Subtraction angiography\*\*

### 5. Ans. (a) **Aortoiliac**

(Ref: *Bailey and Love 27<sup>th</sup> edition page 944 Table*)

- Aortoiliac occlusion is characterized by:
  - Claudication in buttocks, thighs, calves
  - Femoral and Distal pulses absent in both limbs
  - Bruit over Aortoiliac region
  - Impotence (Leriche syndrome)

### 6. Ans. (c) **Saphenous nerve**

(Ref: *Bailey and Love 27<sup>th</sup> edition page 961*)

- LSV stripping can injure- Saphenous nerve
- SSV stripping can injure- Sural nerve

### 7. Ans. (a) **C2a**

(Ref: *Bailey and Love 27<sup>th</sup> edition, Page 974*)

- Please remember "a" is asymptomatic case
- C2 is Varicose veins
- So, this image is C2a
- There is nothing like C2b\*\* in classification of CEAP

### 8. Ans. (c) **Endovascular stenting**

(Ref: *Bailey and Love 27<sup>th</sup> edition page 949*)

- Please remember surgical treatment is reserved only for patients for whom angioplasty is failed.

#### **Transluminal angioplasty and stenting:**

- Following Seldinger needle puncture, the Balloon is passed via the catheter and positioned at the lesion and inflated for 30 seconds and deflated.
- This Percutaneous Transluminal Angioplasty (PTA) is successful for Iliac, Femoropopliteal segments, the results below the knee are less satisfactory.

- Thin graft
- High take up
- Low primary contraction
- Increased secondary contraction

### Latest Concept

Latest Update from Schwartz 11<sup>th</sup> Edition:

#### Types of Partial Thickness Split Grafts:

- **Thin (Thiersh-ollier):** 0.006=0.012 inch thickness
- **Intermediate (Blair-Brown):** 0.012- 0.018 inch thickness
- **Thick (Padgett):** 0.018 -0.024 inch thickness

Thin Split Grafts	Thick Split Grafts
<ul style="list-style-type: none"> <li>• Low Primary contraction</li> <li>• High Secondary contraction</li> <li>• High Reliability of Graft take even in imperfect recipient beds.</li> </ul>	<ul style="list-style-type: none"> <li>• More primary contraction</li> <li>• Less secondary contraction</li> <li>• Less take of graft</li> </ul>
<ul style="list-style-type: none"> <li>• Heal with abnormal pigmentation and poor durability compared with thick split skin and full thickness grafts.</li> </ul>	

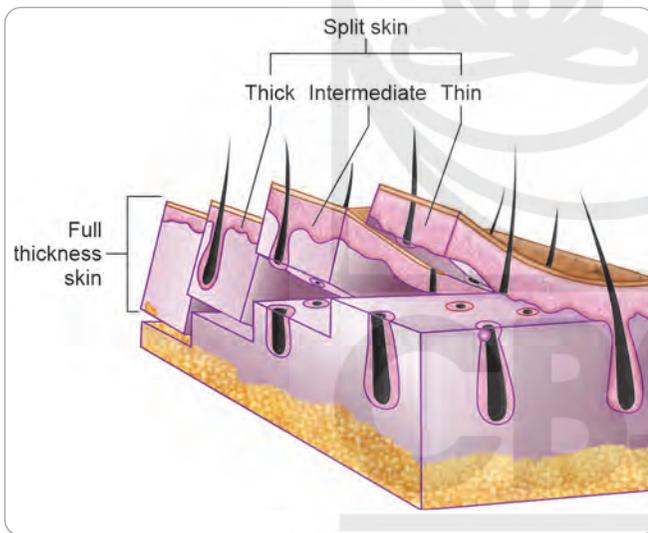


Figure 3: Types of Skin Grafts



Figure 4: Shows secondary contraction in Thin SSG

### Meshing: Split Skin Graft

- Size of the graft can be increased
- It helps to drain any fluid



Figure 5: Partial Thickness Split Skin Graft

### INDICATIONS OF FLAP

Flap is used instead of graft in the following condition:

- Exposed bone (graft can be placed on periosteum but not on exposed bone)
- Exposed tendon (graft can be placed on tendon sheath but not on exposed tendon)
- Exposed joint
- Exposed prosthesis or metal plates
- Complex defects
- Radiation necrosis

### Axial Pattern Flap (Based on a Named Blood Vessel)

- PPMC flap based on Thoraco acromian artery
- DP (Delto pectoral) flap based on Internal Mammary artery
- TRAM flap based on Superior Epigastric Artery or Inferior Epigastric Artery
- DIEP flap (Deep inferior epigastric artery free flap) based on Inferior Epigastric Artery
- PPMC and DP flap used in Oral cavity reconstruction
- TRAM and DIEP flap is used in Breast reconstruction

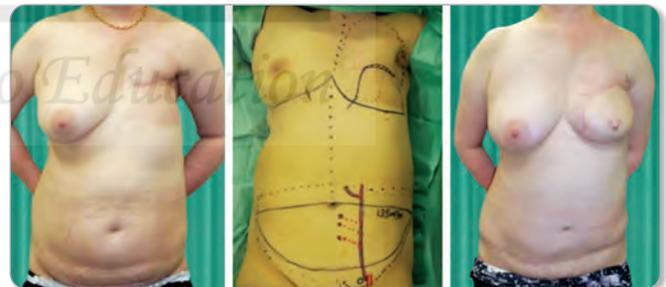


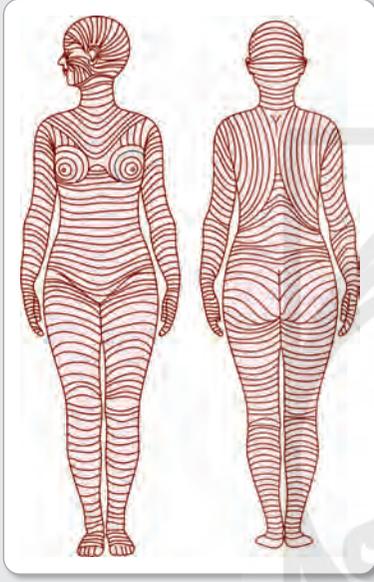
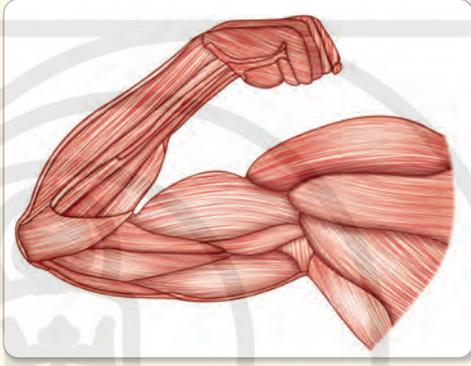
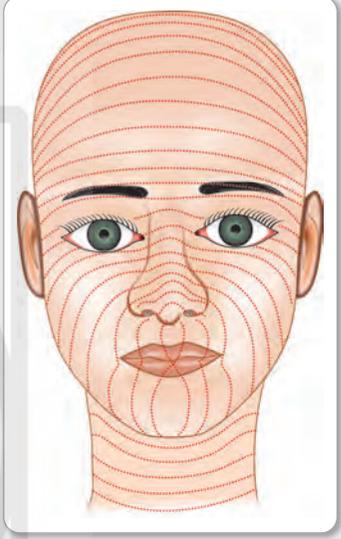
Figure 6: DIEP flap (Free Flap)

### Random Pattern Flap

- It is based on dermal and subdermal plexus
- Accepted length: Width ratio = 3:1



### Extra Edge

Langer's lines:	Kraissl lines:	Borges lines:
<ul style="list-style-type: none"> <li>Cosmetic lines identified in <b>cadavers</b></li> </ul>	<ul style="list-style-type: none"> <li>Lines perpendicular to underlying muscle. Better cosmetic than Langer's line in <b>living patients</b></li> </ul>	<ul style="list-style-type: none"> <li>Lines formed along the furrows when skin is relaxed in <b>face</b></li> </ul>
		

### Dressing Materials in Surgery

- Alginate dressings:** Absorptive used for high drainage wounds with heavy exudates
- Foam dressing:** Also used for high drainage wound, not to be used in non draining wound
- Hydrocolloid dressing:** Used for bedsores, facilitates autolysis debridement and remove the dead tissue, not be to used in high drainage wounds.



Figure 11: Hydrocolloid Dressings

- Hydrogel dressing:** Rehydrates wound bed, not to be used in high drainage wounds
- Transparent film dressing:** Autolytic debridement, not to be used in high drainage wounds
- VAC dressing:** Negative suction of -120mm Hg, TOC for bedsores.

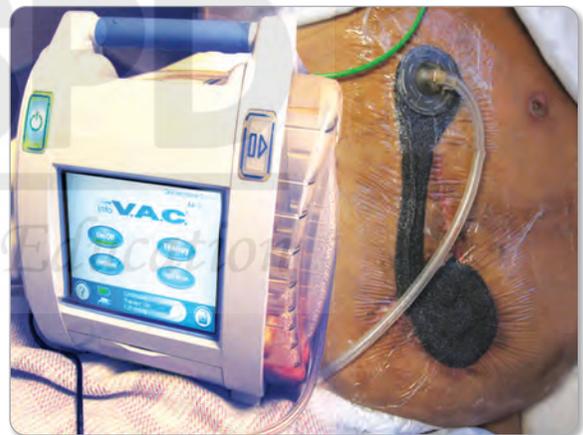


Figure 12: VAC devices

## Multiple Choice Questions

## INI-CET QUESTION

1. **Difference between partial thickness and full thickness graft. Correct statements are:** (INI-CET May 2022)
1. Primary contraction more with SSG
  2. Secondary contraction more with SSG
  3. Primary contraction more with full thickness graft.
  4. Secondary contraction more with full thickness graft
- a. 1 and 2 are correct
  - b. 1 and 3 are correct
  - c. 2 and 3 are correct
  - d. 3 and 4 are correct

## NEET PG NEW PATTERN QUESTION

2. **Degloving injury is characterized by:** (NEET PG 2019)
- a. Loss of Skin only
  - b. Loss of Skin and Subcutaneous tissue with intact fascia
  - c. Loss of Skin and Subcutaneous tissue along with fascia
  - d. Loss of Skin, Subcutaneous tissue and muscle.

## FMGE NEW PATTERN QUESTIONS

3. **Split skin graft is composed of:** (FMGE June 2022)
- a. Only epidermis
  - b. Epidermis and partial dermis
  - c. Epidermis and deep dermis
  - d. Epidermis, dermis, subcutaneous fat
4. **A patient suffering from injury 3 days ago following which he was brought to hospital as shown in the image. What would be the likely treatment in this patient?** (FMGE June 2022)



- a. Debridement and Rotational advancement flap
- b. Debridement and primary closure
- c. Debridement and hyperbaric oxygen
- d. Amputation

5. **What is the use of this instrument in plastic surgery?** (FMGE Question 2017)



- a. To do full thickness graft
- b. To take flap
- c. To take partial thickness graft
- d. To do collagen

NEW PATTERN CLINICAL QUESTIONS  
BY DR RRM

6. **A patient had injury in the lower lid and there is a loss of tissue and needs reconstruction. Which of the following method is used for reconstruction of lower lid?**
- a. Bilobar flap
  - b. Bipedicle flap
  - c. Rhomboid flap
  - d. Z-plasty
7. **Mr. Kumar had a trauma in his leg and a raw area developed exposing the bone as shown in the image. What will be the ideal covering for this raw area by the plastic surgeon?**



- a. Split skin graft
- b. Full thickness graft
- c. Allow it heal by secondary intention
- d. Flaps

## Answers with Explanations

### 1. Ans. (c) 2 and 3 are correct

(Ref: Schwartz 11<sup>th</sup> edition page 1976)

This is based on the table in Schwartz, please remember this table:

	STSG (thin)	STSG (thick)	FTSG
Dermal content	+	++	+++
1° contraction	+	++	+++
2° contraction	+++	++	+
Engraftment	+++	++	+
Durability	+	++	+++
Pigmentation	+++	++	+
Resist desiccation	+	++	+++
Recipient bed	+	++	+++
Appearance	+	++	+++

### 2. Ans. (b) Loss of Skin and Subcutaneous Tissue with Intact Fascia

(Ref: Bailey and Love 27<sup>th</sup> edition page 27)

Degloving injury is defined as an avulsion injury including the following layers:

- Skin
- Subcutaneous Tissue

Please remember the degloving injury is **above the Fascia (Leaving Intact Fascia)** exposing the Neurovascular structures, tendon and bone.

It can be open or closed also.

### 3. Ans. (b) Epidermis and Partial Dermis

(Ref: Bailey and Love 27<sup>th</sup> edition page 634)

- Split skin graft is a partial thickness graft in which only epidermis and part of dermis is taken.
- Full thickness Wolfe graft both epidermis and Dermis are taken.

### 4. Ans. (a) Debridement and rotational advancement flaps

(Ref: Bailey and Love 27<sup>th</sup> edition page 637)

- Wounds which have so much of tissue loss cannot be closed by primary closure.
- Unless the tissues are compromised and gangrenous no need to do amputation.
- This patient is not infected with Clostridium botulinum and hence, not need Hyperbaric oxygen therapy there is no clue given to say this is Clostridium (like crepitus in muscles)
- Hence, for such extensive tissue loss flaps will be ideal to closure.

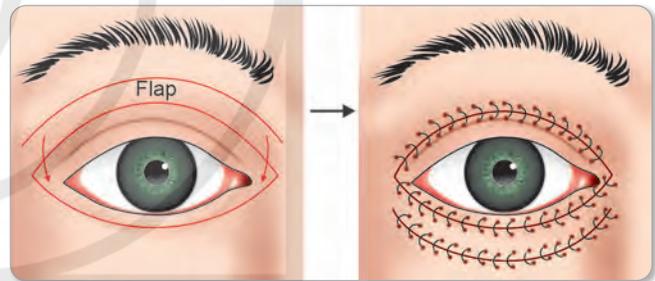
### 5. Ans. (c) To take partial thickness graft

- This is the image of Humby knife used for taking partial thickness graft.

### 6. Ans. (b) Bipedicule flap

(Ref: Bailey and Love 27<sup>th</sup> edition page 641)

- A bucket handle flap supplied from both ends. Useful to rebuild the lower eyelid.



**Bipedicle flap**

### 7. Ans. (d) Flaps

- Exposed bone and tendons will have no blood supply and will need a closure by pedicle or free flaps.

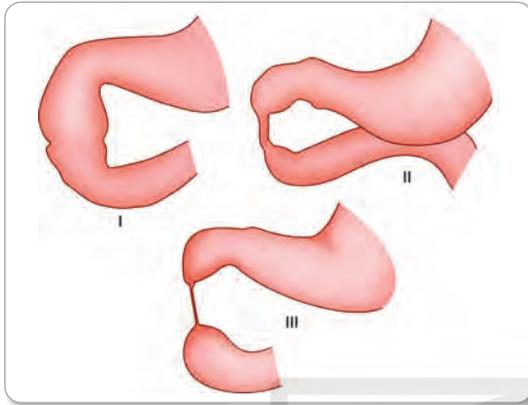


Figure 1: Duodenal atresia types

**Presentation**

- 80%: Bilious vomiting
- 20%: Nonbilious vomiting, atresia is present proximal to ampulla

Treatment of choice duodenoduodenostomy

**JEJUNOILEAL ATRESIA**

- 1 in 2,000 Intrauterine mesenteric ischemia
- Associated with cystic fibrosis

**Types**

- Type I: Mucosal web
- Type II: Fibrous cord + Intact mesentery

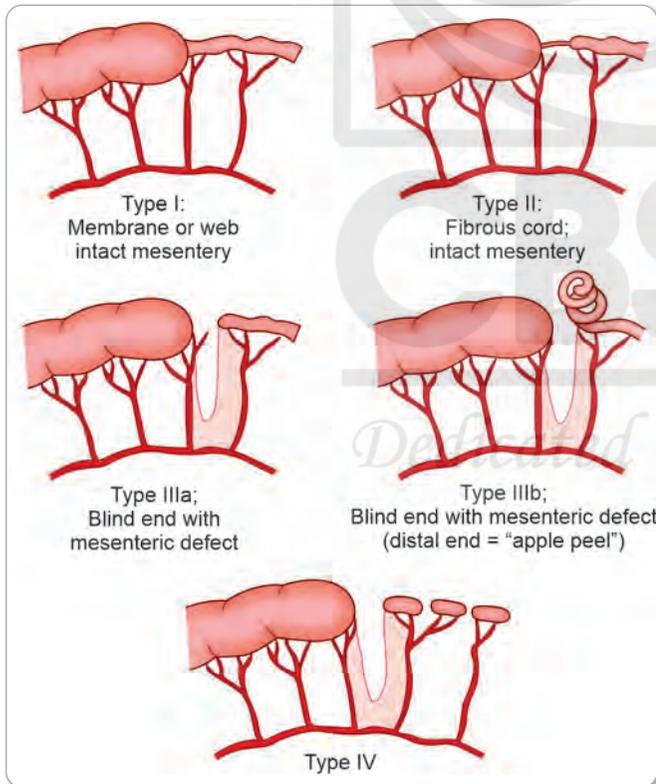


Figure 2: Types of Jejunal atresia

- Type IIIa: Blind end with V-shaped mesenteric defect
- Type IIIb: Distal bowel with **Apple-peel or Christmas-tree appearance\*\***. Distal bowel receives blood supply from ileocolic artery in distal way
- Type IV: Multiple sausage-shaped atresia

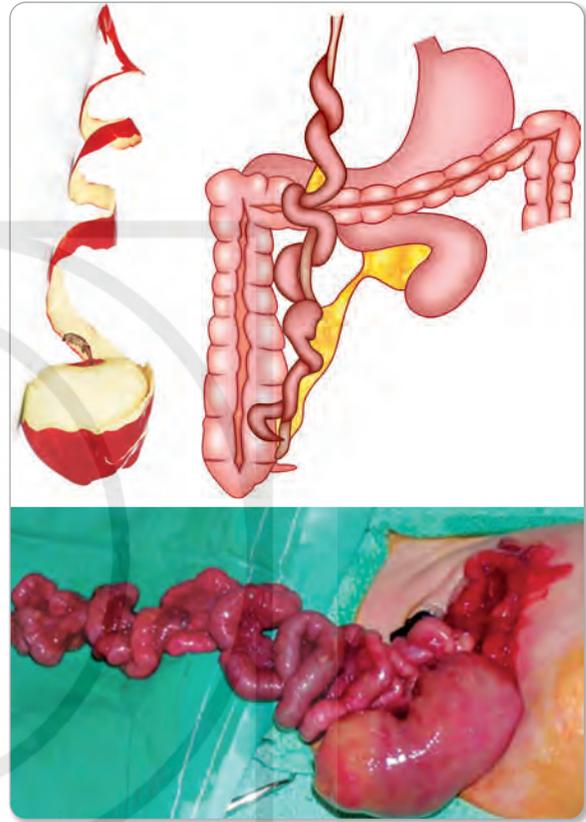


Figure 3: Type IIIb- Apple-peel appearance

**Treatment**

Resect the atresia and anastomose the normal bowel.

**TOPIC 3: CONGENITAL DIAPHRAGMATIC HERNIA**

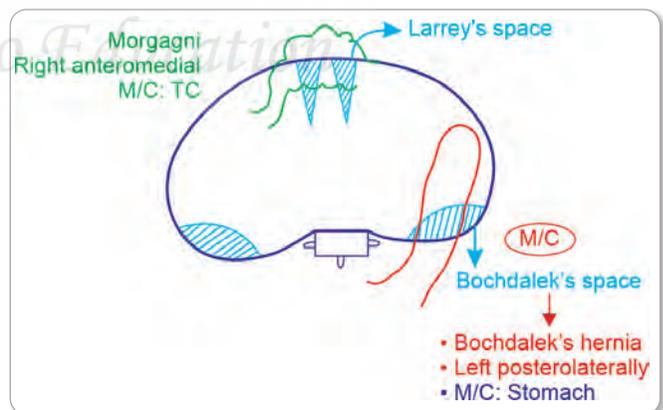


Figure 4: Defects of CDH

## Management of Brain Mets

- DOC: STEROIDS
- Single met (Up to 3) : operated
- Whole Brain RT can be given
- Stereotactic Radiosurgery can be done with Gamma knife or cyber knife

## PRIMARY BRAIN TUMORS

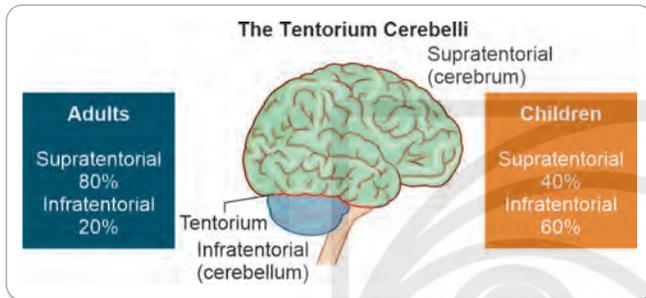


Figure 9: Classification of Brain Tumors

## M/C Primary Tumor of Brain

- Children: Grade I Astrocytoma (Pilocytic)
- Adults: Grade IV Astrocytoma (Glioblastoma Multiforme)

### Adults

- 80% of tumors Supratentorial
- 20% of tumors Infratentorial

### Children

- 40% of tumors Supratentorial
- 60% of tumors Infratentorial

## Types of Cells in Nervous System

- **Neurons:** Structural and functional unit of brain.

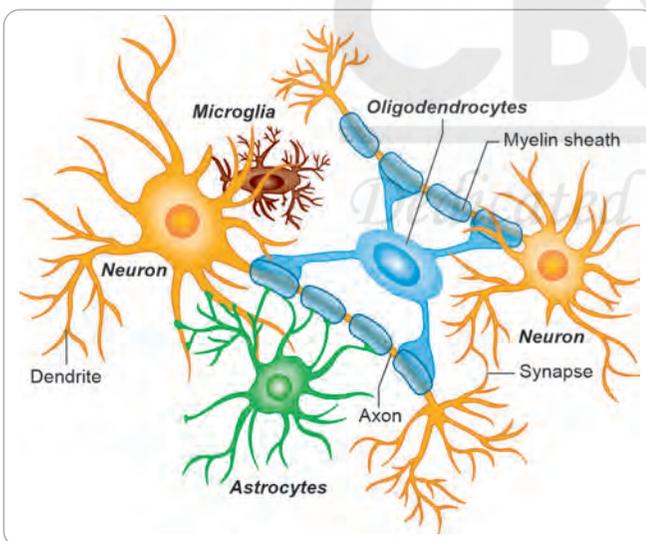


Figure 10: Neurons and neuroglial cells

- **Glial cells:** Supporting cells of neurons.
  - Astrocyte – forms BBB
  - Oligo-dendrocyte – forms myelin in CNS
  - Microglia – Scavengers in immune system
  - Ependyma – Lines ventricular cavities
- **Schwann cells:** Forms myelin in PNS
- **Meninges:** Covers and protects the brain

## Brain Tumors arising from Glial Cells

- Astrocytes: Astrocytoma
- Oligodendrocyte: Oligodendroglioma
- Ependymal cell: Ependymoma

## Other Brain Tumors

- **Meningioma:**
  - Tumor arising from meninges
  - 2<sup>nd</sup> M/C tumor
  - It is the M/C extra axila tumor (Vestibular schwannoma is other axial tumor)
- **Other Malformations seen in brain:**
  - Craniopharyngioma
  - Dermoid cyst

## Pituitary Tumors

- Neuro Endocrine Tumor: Medulloblastoma

## ASTROCYTOMA: (MNEMONIC -NINE)

### Grading based on 4 Criteria

- Nuclear atypia
- Increased cellularity (mitoses)
- Necrosis
- Endothelial proliferation

### 4 Grades

- Grade 1: **Pilocytic Astrocytoma**
- Grade 2: **Diffuse Astrocytoma** – only one criteria (Nuclear atypia)
- Grade 3: **Anaplastic Astrocytoma** - two criteria (Nuclear atypia+ Mitoses)
- Grade 4: **Glioblastoma Multiforme** – three criteria (Nuclear atypia+ Mitoses + Endothelial proliferation or necrosis)

Grade 1 and 2 Low grade tumors/Benign tumors;

Grade 3 and 4 High grade tumors/Malignant

## ASTROCYTOMAS

### Grade 1: Pilocytic Astrocytoma

- Characterized by Mural Nodule
- No infiltration
- M/C in Children.
- Best prognosis among the 4\*\*
- MRI- IOC
- Discrete Contrast Enhancing Cystic lesion with a MURAL NODULE\*\*
- It is curable

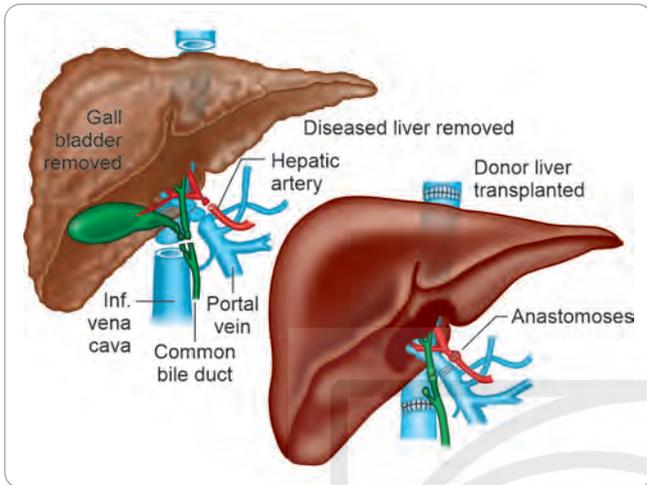


Figure 4: Order of anastomosis in OLT

\*\* Bile duct anastomosis is C/I in Primary sclerosing cholangitis and Extra Hepatic Biliary Atresia  
For the above two conditions do a Roux en Y jejunum anastomosis (NEET SS)

**Piggy Back Transplant**

- If liver alone is removed in Recipient and donor liver is removed along with IVC do PIGGY BACK anastomosis. Advantage is blood flows throughout the process of surgery.

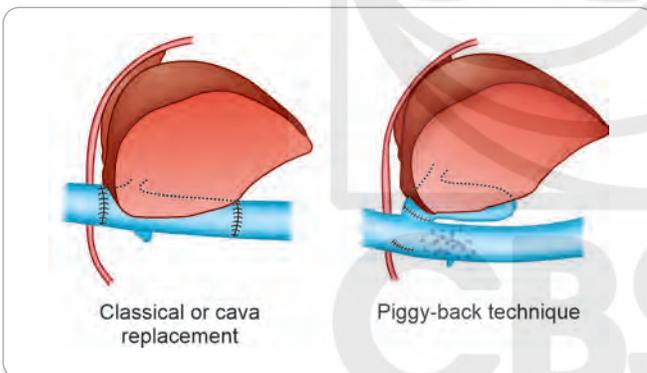


Figure 5: Types of Liver Transplant

**Rejection**

Hyper acute rejection	Acute rejection	Chronic rejection
Rare or not happens in liver transplant	<b>Manifests as Hepatic Artery thrombosis:</b> Immediately need Re transplant	Manifests as vanishing bile duct (Rare)
	Portal vein thrombosis, no Re transplant advised	

- **ROTEM:** Rotational thrombo elastometry used to measure PT/ INR dynamically while transplantation is going on.



**Renal Transplant**

- M/C cause in adults: Renal failure due to Diabetic nephropathy
- M/C cause in children: Chronic glomerulonephritis
- It is always a heterotopic graft (Rt iliac fossa > Lt iliac fossa)

**Types of Graft**

Cadaveric	Live Donor
	Kidney preferred is Lt kidney b/c Lt renal vein is longer

Donor criteria	C/I for donor
<ul style="list-style-type: none"> <li>• Age 18 – 70 Years</li> <li>• BMI &lt; 35</li> <li>• No cancer</li> <li>• No active sepsis</li> <li>• Kidney has normal function</li> <li>• ABO compatibility/HLA matching</li> </ul>	<ul style="list-style-type: none"> <li>• BMI &gt; 40</li> <li>• DM</li> <li>• Malignancy</li> <li>• HIV +ve, sepsis</li> <li>• HTN</li> <li>• GFR &lt; 70, Albuminuria</li> <li>• Horse shoe kidney</li> <li>• Kidney stones</li> </ul>

**Procedure**

- In cadaveric kidney along with the renal artery, small portion of the aorta is also removed known as Carrel patch

**Ureter is anastomosed to the bladder by:**

- Short tunnel technique @ Lich Gregoir technique M/C done
- Long tunnel technique @ Lead Better Politano technique

Renal vein anastomosed to common iliac vein

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## About the Author

**R Rajamahendran**, MS, MRCS (Edinburgh), FMAS, MCh (Surgical Gastro), is presently working as a Senior Assistant Professor in Surgical gastroenterology Department in Government Medical College, Villupuram, Tamil Nadu.



He is a renowned Indian author/surgery faculty who has been contributing to the field since 2007. His Illustrative teaching method and surgical skills make him a renowned and most opted Surgery faculty of the country. His experiences and encounters with various patients during his practice and his future guidance for the PG aspirants have been an eye opener for a number of medical college students and medical practitioners. He covers entire surgery merely in 6 days class, which makes students confident to approach surgery questions of INI CET and NBE exams.

He has completed his MBBS and MS (General Surgery) from Government Kilpauk Medical College, Chennai with best academic score. He joined MCh Surgical Gastroenterology in Madras Medical College, Chennai by acquiring the top rank in state entrance examination. He received a Gold Medal for his studies on Esophagus. He completed MRCS from Royal College of Edinburgh. Other fellowships to his credit are: FMAS, Dip. Lap, FMGE. He has published about 10 articles in National and International Journals as a prime author and co-author. He has presented more than 30-40 papers in various conferences and workshops.

He is the Founder/ Faculty/ Director of RRM Next PG/ SS medical coaching center, a leading coaching institute for NEET PG aspirants in South India and a leading Institute for Super Speciality entrance exams in the country. He is a well-known Surgical Gastroenterologist and GI onco-surgeon with specialization in Advanced Laparoscopic Surgeries in Villupuram District, Tamil Nadu. The author is the Founder/Director of RRM Gastro Super Speciality Clinic and Endoscopy Center, Villupuram.

While most of the faculties keep themselves involved only in their classes, Dr. Rajamahendran, a multifaceted personality, contributes to the academic world as Faculty, Author, Motivator and Clinician. Apart from this, he carries enormous and astonishing Surgical Skills in Advanced Laparoscopy, Pancreatic and Biliary Surgeries. His record on Pancreatic surgeries and Researches on outcomes of the Pancreatic operations have made his hospital one of the main referral centers for Pancreatic Surgeries.

He is a famous academician and has been contributing to medical science as an author since 2009. Some of his highly acclaimed books are Long Cases in Surgery, Short Cases in Surgery, Clinical Cases in Paediatrics, Nutshell Series for FMGE, 20 Authors for TNPG, JIPMER 20 Authors, AIPG 20 Authors, Complete Review of Surgery, Tumors in 10 Days, etc.

He is the pioneer to start MCh entrance coaching in India. Presently most of the Surgical postgraduates and Surgeons are receiving trainings from Dr Rajamahendran's RRM NEXT NEET SS Institute based at Chennai and Delhi.

Last but not least, he contributes to leading online APP platform- Doctutorials as Surgery Faculty and teaches in many other Coaching institutes including ARISE, MED PG, Self-Mastered, DPGI, etc. at Chennai and Delhi.



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