

**STANDARD TREATMENT
GUIDELINES
GENERAL SURGERY**

**Ministry of Health & Family Welfare
Govt. of India**

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BLUNT ABDOMINAL TRAUMA

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1. **Name of the condition:** Blunt abdominal trauma
2. **When to suspect/ recognize?**
 - a. **Introduction:** Blunt abdominal trauma (BAT) is an increasingly common problem encountered in the emergency department. The usual causes of BAT include vehicular accident, assault, falls, sports injuries and natural disasters.
 - b. **Case definition:** BAT is suspected in any patient involved in above situations and presents with abdominal pain, distention or shock. It should be looked for in patients of polytrauma.
3. **Incidence of the condition in our country:** One study has reported 2.1% incidence of BAT amongst all surgical patients admitted to a tertiary hospital during 1 year.
4. **Differential diagnosis:** Abdominal trauma forms a differential diagnosis of any patient presenting with acute abdomen.
5. **Prevention and counseling:** Use of appropriate safety measures during various activities associated with BAT can significantly reduce its incidence.
6. **Optimal diagnostic criteria, investigations, treatment and referral criteria:**
 - a. **Situation 1 At Secondary Hospital/ Non-metro situation: Optimal standard of treatment in situations where resources are limited**
 - I. **Clinical diagnosis:** This is based on
 - a. High level of suspicion of intra-abdominal injury
 - b. Presence of wounds/ bruising on the abdomen
 - c. Abdominal guarding/ tenderness
 - d. Presence of free gas/ fluid in the peritoneal cavity
 - e. Presence of fracture of lower ribs and/ or pelvis increases the likelihood of intra-abdominal injury
 - f. Note should be made of altered mental state, drug or alcohol intoxication and distracting injuries which may mask the features of BAT
 - g. Repeated examination increases the accuracy of diagnosis
 - II. **Investigations:**
 - a. All hemodynamically stable patients with suspected BAT should undergo Focused Abdominal Sonography in Trauma (FAST) or Diagnostic Peritoneal Lavage (DPL)
 - b. Urgent laparotomy is indicated in patients with evidence of BAT who remain hemodynamically unstable despite initial resuscitation
 - III. **Treatment (Standard operating procedure):**
 - a. Inpatient:

- i. All patients should have initial cervical stabilization and resuscitation, if required
 - ii. Initial fluid resuscitation should be done with 2L warmed Ringer Lactate solution infused rapidly through 2 peripheral lines
 - iii. A nasogastric tube and a Foley catheter should be put
 - iv. Laparotomy should be done, if indicated on the basis of clinical features, FAST or DPL
 - v. Laparotomy should be done through a long midline incision
 - vi. Bleeding should be controlled by clamping/ packing till definitive control is possible
 - vii. Hollow viscus should be repaired
 - viii. In case the intra-abdominal injuries are extensive, patient is very sick and OT facilities/ surgeon's experience is suboptimal, Damage Control Surgery may be done. Definitive surgery should be done subsequently under improved circumstances or at a higher center.
 - b. Outpatient: Not indicated
 - c. Day care: Not indicated
- IV. Referral criteria: After Damage Control Surgery if the local facilities are inadequate.

b. Situation 2 At Superspecialty Facility in Metro location where higher end technology is available

1. Clinical diagnosis: Same as 6a
2. Investigations:
 - a. Same as 6a
 - b. CECT abdomen is preferred investigation in all hemodynamically stable patients with BAT
 - c. Angiography and angioembolization may be considered in hemodynamically stable patients with solid organ injury who are suitable for non-operative management
3. Treatment (Standard operating procedure):
 - a. Inpatient:
 - i. Same as 6a
 - ii. In case the intra-abdominal injuries are extensive, patient is very sick and surgeon's experience is suboptimal, Damage Control Surgery may be done. Definitive surgery should be done subsequently under improved circumstances
 - iii. Angiography and angioembolization may be considered in hemodynamically stable patients with solid organ injury who are suitable for non-operative management
 - b. Outpatient: Not indicated
 - c. Day care: Not indicated
4. Referral criteria: Not indicated

7. Who does what and timelines:

- a. Doctor: Does initial evaluation, subsequent monitoring, decision regarding investigations and therapeutic intervention.
- b. Nurse: Assists in resuscitation, monitoring, investigation and treatment.
- c. Technician: Assists in resuscitation, investigation and treatment.

8. Further reading/ references

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CHOLECYSTECTOMY

Dr. Arun Prasad

INTRODUCTION:

Cholecystectomy is one of the commonest elective surgical procedure performed in India. Most are performed to address symptoms related to biliary colic from cholelithiasis, to treat complications of gallstones (eg, acute cholecystitis, biliary pancreatitis), or as incidental cholecystectomies performed during other open abdominal procedures. Currently, most cholecystectomies are done using the laparoscopic technique in cities; however, the open technique is required in places where facilities or trained staff are not available.

DEFINITION:

Cholecystectomy implies the surgical resection the gall bladder.

INDIAN INCIDENCE

In India, the incidence of gall stones is around six percent in the total population. It is 10 per cent in women and three per cent in men. In elderly people it may go up to 20 percent.

INDICATIONS:

Asymptomatic patients

Cholecystectomy is not indicated in most patients with asymptomatic stones because only 2-3% of these patients go on to become symptomatic per year. To properly determine the indications for elective cholecystectomy, the risk of the operation (taking into account the age and comorbid factors of the individual patient) must be weighed against the risk of complications and death without operation.

The widespread use of diagnostic abdominal ultrasonography has led to the increasing detection of clinically unsuspected gallstones. This, in turn, has given rise to a great deal of controversy regarding the optimal management of asymptomatic (silent) gallstones.

Patients who are immunocompromised, are awaiting organ allotransplantation, or have sickle cell disease are at higher risk of developing complications and should be treated irrespective of the presence or absence of symptoms.

Additional reasons to consider prophylactic cholecystectomy include the following:

- Calculi >3 cm in diameter, particularly in individuals in geographical regions with a high prevalence of gallbladder cancer
- Chronically obliterated cystic duct
- Nonfunctioning gallbladder
- Calcified (porcelain) gallbladder
- Gallbladder polyp >10 mm or showing rapid increase in size

- Gallbladder trauma
- Anomalous junction of the pancreatic and biliary ducts
- Morbid obesity is associated with a high prevalence of cholecystopathy, and the risk of developing cholelithiasis is increased during rapid weight loss. Routine prophylactic cholecystectomy prior to gastric bypass (RYGB) is controversial, but cholecystectomy should clearly precede or be performed at the time of RYGB in patients with a history of gallbladder pathology.

Symptomatic gallstone disease

Biliary colic with sonographically identifiable stones is the most common indication for elective cholecystectomy.

Acute cholecystitis, when diagnosed within 72 hours from the onset of symptoms, can and usually should be treated by surgery. Once 72 hours pass after the onset of symptoms, inflammatory changes in the surrounding tissues are widely believed to render dissection planes more difficult. Interval cholecystectomy after 4-6 weeks or percutaneous cholecystostomy are other options.

Biliary dyskinesia should be considered in patients who present with biliary colic in the absence of gallstones, and a cholecystokinin–diisopropyl iminodiacetic acid (CCK-DISIDA) scanning should be obtained. The finding of a gallbladder ejection fraction <35% at 20 minutes is considered abnormal and constitutes another indication for cholecystectomy.

Complex gallbladder disease

Gallstone pancreatitis

Cholecystectomy can be safely performed during the same hospitalization after the clinical signs of mild to moderate biliary pancreatitis have resolved. Patients diagnosed with gallstone pancreatitis should first undergo imaging to rule out the presence of choledocholithiasis.

Cholecystectomy should be delayed in cases of acute moderate to severe biliary pancreatitis (5 Ranson criteria).

Choledocholithiasis

The following treatment options are available for patients found to have choledocholithiasis:

Preoperative ERCP with sphincterotomy

Postoperative ERCP with sphincterotomy

Laparoscopic intraoperative cholangiogram with laparoscopic common bile duct (CBD) exploration

Open CBD exploration and T-tube placement

Mirizzi syndrome

P.L. Mirizzi described an unusual presentation of gallstones that, when lodged in either the cystic duct or the Hartmann pouch of the gallbladder, externally compressed the common hepatic duct, causing symptoms of obstructive jaundice.

Although an initial trial of dissection may be performed by an experienced laparoscopic biliary surgeon, one must be prepared for conversion and for biliary reconstruction.

Endoscopic stone fragmentation at ERCP, with papillotomy and stenting, is a viable alternative to operative surgery to treat Mirizzi syndrome in the acute setting.[24]Subsequent cholecystectomy may be performed.[25]

Cholecystoduodenal fistula

Patients with cholecystoduodenal fistula leading to gallstone ileus should undergo exploratory laparotomy and removal of the stone, followed by exploration of the remainder of the gastrointestinal tract for additional stones. The fistula may be addressed at the time of the initial procedure but is probably better addressed at a second operation (3-4 wk postoperatively) after inflammation has subsided.[25]

Cholecystenteric fistula does not represent an absolute contraindication to laparoscopic surgery, although it does require careful visualization of the anatomy and good laparoscopic suturing skills.

Acalculous cholecystitis

A greater proportion of patients with acalculous cholecystitis are too ill to undergo surgery. In these situations, percutaneous cholecystostomy guided by CT or ultrasonography is advised. Ninety percent of these patients demonstrate clinical improvement. Once the patient has recovered, the cholecystostomy tube can be removed, usually at 6 weeks, without sequelae. Interval cholecystectomy is not necessary.[27]

Incidental gallbladder cancer

Gallbladder cancer may be an incidental finding at cholecystectomy, with an incidence ranging from 0.3-5.0%.

Uncertainty of diagnosis, uncertainty of the degree of tumor spread, or postoperative identification of cancer on pathological examination of a routine cholecystectomy specimen should engender early reoperation.

Before reoperation, distant metastases should be excluded by a detailed clinical examination including a per-rectal/per-vaginal examination, examination for supraclavicular lymph nodes, and CT/MRI of the chest and abdomen.

Special situations

Children

Cholecystectomy is a safe and effective treatment for most children diagnosed with biliary disease (BD).

Cirrhosis

Cholecystectomy is safe in patients with Child class cirrhosis.

Diabetes mellitus

The presence of diabetes mellitus, in and of itself, does not confer sufficient risk to warrant prophylactic cholecystectomy in asymptomatic individuals.

However, consider that acute cholecystitis in a patient with diabetes is associated with a significantly higher frequency of infectious complications such as sepsis.

Pregnancy

The treatment of biliary colic or uncomplicated cholecystitis in a pregnant patient is conservative management followed by elective cholecystectomy. Using antibiotics, analgesics, and antiemetics help most pregnant women avoid surgical intervention. Surgery is generally indicated for patients with recurrent acute cholecystitis who have failed maximal medical therapy.

Classically, the second trimester is considered the safest time for surgery. This is because of the findings of increased risk for spontaneous abortion and teratogenesis during the first trimester, and the increased risk for premature labor and difficulties with visualization in the third trimester.

Pregnancy was formerly considered to be an absolute contraindication to the laparoscopic approach because of concern for potential trocar injury to the uterus and the unknown effects of pneumoperitoneum to the fetal circulation. However, this has not been borne out in the literature, and cholecystectomy is now considered safe.

Recommendations for pregnant patients who undergo laparoscopic cholecystectomy include placing them in the left lateral recumbent position to shift the weight of the gravid uterus off the vena cava and maintenance of insufflation pressures between 10 and 12 mm Hg. In addition, maternal PaCO₂ monitoring must be performed by measuring either arterial blood gases or end-tidal CO₂, but arterial PaCO₂ may be more accurate.

Other recommendations include avoiding rapid changes in intraperitoneal pressures, avoiding rapid changes in patient position, and using open technique for the umbilical port placement.

Distance from medical centres

In India, another indication can be distance from a treating hospital as long travel that may be needed can lead to complications.

INVESTIGATIONS:

- Haemogram
- Liver Function Tests
- Blood sugar
- Serum creatinine
- Bleeding time, clotting time and prothrombin time
- Xray chest

- ECG
- USG abdomen
- In patients with dilated common bile duct or raised liver functions, MRCP or ERCP may be indicated based on availability. Alternatively, an on table cholangiogram or CBD exploration may be done during surgery. Patient can be referred to another centre in case of non availability of expertise or experience.

OPERATIVE TECHNIQUES:

Principles of surgery remain the same regardless of whether it is being done by open or laparoscopic technique.

- Safe access to abdomen.
- Clear definition of anatomy in the calots triangle showing either the continuity between cystic duct and gall bladder or junction between cytic duct and common bile duct.
- Avoiding diathermy close to common bile duct.
- Securing cystic artery safely and close to the gall bladder.
- Dissection from liver bed staying close to gall bladder.
- Early conversion to open procedure in case of a difficult laparoscopic surgery.

REFERRAL CRITERIA:

- Common bile duct stones if no facilities for management available.
- Suspected gall bladder cancer.
- Bile duct injury during surgery. Patient should be referred to a tertiary centre as soon as possible.

WHO DOES WHAT?

Doctor:

- a) Surgeon: diagnosis & work up
Pre operative planning
Operative procedure
Post operative follow up

b) Anesthetist: PAC, anesthesia, post op ICU management

NURSE:

- Dressing of the wound
- Pre & post operative care

TECHNICIAN:

- Pre op equipment and drugs to be checked and kept ready
- Assist anesthetist in the OT
- Assist the surgeon, positioning of the patient

RESOURCES REQUIRED FOR ONE PATIENT / PROCEDURE (Patient weight 60 Kgs)

Human Resources	Investigations	Drugs/Consumables	Equipment
Surgeon – 1	Haemogram	Antibiotics	OT Table & lights
Medical Officer /	LFT	Analgesic	Instrument trolley
Assistant Surgeon – 1	Blood Sugar	I.V. Fluids	Laparoscopic Surgery set
Anesthetist – 1	S. Electrolytes	Sutures	General Surgery Set
Pathologist – 1	KFT	Drains	Cautery
Staff Nurse – 1	ECG	Catheters	Suction
Technician – 1	X-Ray – Chest	Anesthetic drugs	Anesthetic Equipment
Nursing Orderly – 1	USG	Dressings	Monitors
Sweeper – 1	Histopathology		

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CIRCUMSION

INTRODUCTION:

Religious male circumcision is considered a commandment from God in Judaism widely practiced in Islam and customary in Christian churches in Africa. Virtually all the current policy statements from specialty societies and medical organizations do not recommend routine neonatal circumcision

The opponents to circumcision consider it a violation of human rights

CASE DEFINITION:

The words “circumcision” is derived from the Latin circum (meaning “around”) and coedre (meaning “to cut”). Male circumcision is the removal of some or the entire foreskin (prepuce) from the penis

MEDICAL INDICATIONS:

- In infants and young boys – true phimosis caused by BXO (Balanitis xerotica obliterans)
- Recurrent balanoposthitis
- Recurrent UTI’s with an abnormal upper urinary tract
- Phimosis may result from misguided attempt by parents to expose the glans forcibly
- In adult – inability to retract prepuce for intercourse
- Splitting of an abnormally tight frenulum
- Balanitis
- Before radiotherapy for carcinoma penis
- Paraphimosis
- Diabetes mellitus with recurrent balanoposthitis
- HIV
- UTI

INCIDENCE:

Proportion of males circumcised worldwide vary from one sixth to a third

Circumcision is most prevalent in the Muslim countries of the world

In India too, it is nearly 100% among Muslims

PREVENTION AND COUNSELLING:

Physiological adhesion between the foreskin and glans penis may persist until 6 years of age and be mistaken for phimosis. Forcible retraction of the skin is not recommended in physiological phimosis.

At 4-5 years of age, topical corticosteroid cream may be used for 6 weeks if phimosis continues to exist.

Circumcision – is done if it is

- Resistant to topical steroid therapy
- If patient requires treatment for balanitis
- When there is urinary obstruction due to very high prepuce

Carcinoma penis should be ruled out. When confined to prepuce, circumcision may be adequate treatment but regular follow up is necessary

Similarly chancere which may present as phimosis should be ruled out

Balanitis xerotica obliterans – normal foreskin becomes thickened and does not retract

Has increased susceptibility to carcinoma and hence requires early treatment

Treatment is circumcision

OPTIMAL DIAGNOSTIC CRITERIA:

Phimosis is diagnosed by inability to retract the prepucial skin

SITUATION 1:

i. PHIMOSIS: clinical features

- Inability to retract the prepuce
- Ballooning of prepuce (second bladder) in children
- Balanoposthitis because of inability to clean the glans

ii. PARAPHIMOSIS: clinical features

Retracted prepuce cannot be pulled forward; forms a tight ring and acts as constriction. Venous congestion increases with swelling of glans and can result in ulceration and gangrene of the glans

iii. History of diabetes with recurrent attacks of balanoposthitis

iv. History of bleeding and short duration of lack of retractibility would suggest carcinoma

v. History of STD; sexual history to r/o chancere

DIFFERENTIAL DIAGNOSIS:

1. Chancre
2. Cancer
3. Meatal stenosis (masked by prepuce)

INVESTIGATION:

Simple phimosis is a clinical diagnosis and requires no investigation for confirmation

Routine investigation before surgery such as

Blood sugar

Haemogram

Urine r/m

X Ray and ECG may be done as per anaesthetic indication

Biopsy of underlying lesion if any

USG of the abdomen and pelvis to evaluate the entire urinary tract in cases of UTI

TREATMENT:

Medical treatment in children 5-6 years with congenital phimosis – topical steroid cream

Surgical treatment – circumcision

PROCEDURE:

In infant:

Applying a clamp (or bone forceps) across the prepuce distal to the glans with blind division of the foreskin is to be condemned

Perform a proper circumcision under direct vision as in an adult

ANAESTHESIA –

GA – in children, infants and neonates

Dorsal penile nerve block, Ring block and / or EMLA (lidocaine/prilocaine) topical cream may be used in adults

Rasmus et al reported that newborns circumcised with the dorsal block and ring block in combination with oral sucrose had lowest pain scores

Wg et al found EMLA cream in addition to local anaesthetic effectively reduces the sharp pain induced by needle puncture

In adults frenular stretch must to avoid bleeding from frenular artery

Histopathology: should be done when there is suspicion of malignancy or other associated conditions

POST OP:

Analgesic

Antibiotic: perioperative dose

Abstinence for 4-6 weeks in adults

The patient should be reviewed 5-7 days post op

Retract and clean any skin covering the glans to prevent adhesion

COMPLICATINS OF CIRCUMCISION:

- Bleeding most common
- Infection
- Scar
- Meatal stenosis
- Phimosis in later life – if insufficient skin is removed in a child during the first surgery
- Skind bridge formation in infants

SOP: Day care

REFERAL CRITERIA:

The patient should be referred to a higher centre for treatment of associated conditions if any, such as malignancy

Patient with bleeding disorders and co morbidities may be safely operated in a higher centre

SITUATION 2:

DIAGNOSIS: Clinical as in situation 1

INVESTIGATIONS: as in situation 1

HbA1C

Coagulation profile if bleeding disorder is suspected

TREATMENT:

As in situation 1

Additional procedures:

Devices are available for infant circumcision – Plastibell, Gomco clamp, or Mogen clamp used together with a restraining device

1. Frenulum may need to be broken or crushed and cut from the corona near the urethra to ensure that the glans can be freely and completely exposed

SOP: Day care

WHO DOES WHAT? AND TIMELINES

a. Doctors:

- Clinical examination
- Diagnosis
- Planning surgery
- Surgery
- Post op care
- Anesthesia

b. Nurse:

- Pre & post operative care
- Assisting during surgery

c. Technician:

- Pre op equipment and drugs to be checked and kept ready
- Assist anaesthetist in the OT
- Assist the surgeon

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RESOURCE REQUIRED FOR ONE PATIENT / PROCEDURE (Patient weight 60 kgs.)

Situation	Human Resources	Investigations	Drugs/Consumables	Equipment
1	Surgeon -1 Medical officer/ Assistant surgeon – 1 Staff nurse – 1 Technician – 1 Nursing orderly – 1 Sweeper – 1	Haemogram Urine analysis Blood sugar	Antibiotics Analgesics Iv fluids Sutures Anesthetic drugs Lignocaine dressings	OT Table and lights Autoclave Instrument trolley General surgery set Cautery Suction Pulse oximeter Anesthetic equipment
2	Consultant – 1 Resident – 1 Staff nurse – 1 Technician – 1 Nursing orderly – 1 Sweeper - 1	Same as above + hbA1C coagulation profile ECG X-Ray chest	Same as above	Same as above + Plastigell / gomco / vogen clamps

COLECTOMY

Dr. Ajit Sinha &
Dr. V. Ramesh

INTRODUCTION:

Sir William Arbuthnot was one of the early proponents of the usefulness of total colectomies.

Colectomy is commonly performed for the treatment of colon cancer.

DEFINITION:

Colectomy implies the surgical resection of any extent of the large intestine (colon).

Based on the segment of colon removed colectomies are termed as

1. Right hemicolectomy.
2. Extended right hemicolectomy
3. Transverse colectomy
4. V resection
5. Left hemicolectomy
6. Extended left hemicolectomy
7. Sigmoidectomy
8. Proctosigmoidectomy
9. Total colectomy
10. Total proctocolectomy
11. Subtotal colectomy

INDIAN INCIDENCE: not documented

DIFFERENTIAL DIAGNOSIS:

- Polyps
- Inflammatory bowel disease-ulcerative colitis, Crohn's disease
- Tuberculous stricture of the large bowel with obstruction

- Vascular malformations with lower gastro intestinal bleeding
- Amoebiasis

PREVENTION:

In familiar situations like FAP & HNPCC early colectomy is advised.

It is important to understand the carcinogenesis in colorectal cancer & the associated molecular events.

ENVIRONMENTAL FACTORS also play an important role, particularly dietary factors & estrogen replacement.

Association between hyperplastic polyposis & colorectal cancer & adenomas called sporadic MIS tumours

Colorectal cancers: are Sporadic in 75% cases & Genetic in 25% (younger age at diagnosis)

Positive Familial history is present in 15%-20%.

HNPCC (5%)-80% risk

FAP(less than 1%)-100% risk of development of CRC – prophylactic total colectomy/proctocolectomy

COUNSELLING:

GENETIC COUNSELLING

PREDISPOSITION SHOULD BE COUNSELLED & SCREENED FOR COLON CANCER.

Screening colonoscopy and polypectomy – reduces colon cancer mortality.

1. OPTIMAL DIAGNOSTIC CRITERIA:

Situation 1
Clinical Diagnosis

Anatomical locations and clinical manifestations of colon cancer

Distribution %	Ascending / Caecum	Transverse	Descending/Sigmoid
Manifestations	Bleeding Anemia Malena Abdominal pain Mass obstruction	Abdominal pain Obstruction Mass	Changing bowel habit Obstruction Mass Abdominal Mass

	Diarrhoea		obstruction Perforation Low back pain
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INVESTIGATIONS:

- Haemogram
- Colonoscopy – investigation of choice
 - - Biopsy & HPE
 - Brush cytology if biopsy is not possible
- X-ray abdomen – if patient presents with features of large bowel obstruction
- Double contrast barium enema :
 - When colonoscopy is contra indicated or not available
 - Findings – constant irregular filling defect
 - Detects associated lesions
 - Small ulcerative lesions can be diagnosed
- USG abdomen
- Endoluminal ultrasound – if available
- CECT – if available is used in large palpable abdominal masses
 - = To determine local invasion
- Urograms – when evidence of hydronephrosis on USG/ CT in left sided tumours

TREATMENT:

1. Pre op evaluation of staging, respectability, patient's operative risks are mandatory.
2. Accurate localization of tumour – of particular importance.
 - a. Sometimes known cancer may not be apparent on serosal aspect.
 - b. Localization by tattooing during colonoscopy, Barium enema.
 - c. Pre op CT, USG assessment of liver metastasis should be done

PRE OP PREPARATION:

Mechanical bowel preparation

Prophylactic antibiotics

Blood grouping and cross matching

Thromboembolism prophylaxis

OPERATIVE TECHNIQUES:

Resection should follow

Standard oncological principles:

- Proximal ligation of primary arterial supply at its margins
- Adequate proximal & distal margins(5 cm) determined by area supplied by the primary feeder artery
- Appropriate lymphadenectomy – harvesting of minimum 12 nodes
- Extent of resection is an important prognostic factor (SAGES guidelines 2000)
- Any tumour not removed intraoperatively strongly influences prognosis & therapy

Ro – absence of residual tumour, margins free histologically

R1 – no gross residual tumour but margins histologically positive

R2 – residual gross disease remains unresected

RADIAL MARGIN:

T4 lesions are a complex group & should be considered separate from other T groups

Radial tumour free margins should be resected. Radial margin should be histologically free of disease for resection to be curative.

Specimen labeling, marking are important for a good pathological report

R1 & R2 resection – incomplete resection for cure affects curability though TNM stage remains same

LATERAL CIRCUMFERENTIAL MARGIN:

In addition to radial, proximal & distal margins, circumferential margins should also be pathologically assessed. Positive margins are associated with increased rate of local and distal failure.

Disease free survival and mortality significantly related to margin involvement after TME

ADJUVANT Ro stage:

Adjuvant therapies require complete resection

A case is not Ro if it is

- Non enbloc resection
- Radial margins positive for disease
- Bowel margin positive for disease
- Residual lymph node disease present or
- Nx (incomplete staging)

LYMPHADENECTOMY:

Should be radical (up to the level of origin of primary feeding artery)

Apical nodes positive for disease may have prognostic significance in addition to number of positive lymph nodes

ENBLOC RESECTION of adherent tumours : En bloc removal of adjacent organs locally invaded by cancer colon can achieve survival rates similar to patients with tumour that do not invade an adjacent organ, provided negative resection margins are achieved.

PERFORATION OF TUMOUR SHOULD BE AVOIDED (SAGES GUIDELINE)

Inadvertent full thickness perforation of rectum would probably classify tumour as T4 and resection as R1

Perforation at the site of cancer, as opposed to an area remote from the tumour has a greater impact on survival & local recurrence.

Inadvertent local perforation predisposes to local recurrence and warrants post-operative radiotherapy.

INTRAOPERATIVE SPILLAGE:

HAS AN INDEPENDENT EFFECT ON PROGNOSIS

Adjuvant radiotherapy may be considered to decrease rates of local recurrence

NO TOUCH TECHNIQUE:

Value inconclusive

SURGICAL PROCEDURES:

Anatomical Resection of Colon Cancer

Tumour location	Vascular Ligation	Colon resection	Anastamosis
Caecum, ascending colon	ileo-colic, right colic	Right hemicolectomy	ileotransverse colostomy
Hepatic flexure, Proximal transverse colon	ileocolic right, middle colic	Extended right hemicolectomy with omentectomy	ileodescending colostomy
Distal transverse colon splenic flexure	ileocolic right, middle or left branch of middle colic, left colic	Extended right hemicolectomy with omentectomy or Left hemicolectomy	ileosigmoid colostomy or Transverse sigmoid colostomy
Descending colon	Inferior mesenteric or left colic	Left hemicolectomy	Transverse colorectal anastamosis
Sigmoid colon	Inferior mesenteric or sigmoid	Left colectomy or Sigmoid resection	Transverse colorectal anastamosis or descending colorectal anastamosis

Colectomy may be performed by the

- i) Conventional open technique

REFERRAL CRITERIA:

Patients suspected of colon cancer & biopsy proven should be referred to a higher centre for further evaluation and treatment when

- 1) Adequate surgical facilities are not available / surgeon does not have sufficient experience in colon cancer surgery.
- 2) Competent pathologist to report on malignant lesions as per standard oncological guidelines is not available.
- 3) For adjuvant / neo-adjuvant radio and chemo therapy

TREATMENT:

Patient requiring colectomy for biopsy proven cancer are best referred to a super specialty centre

In view of the need for multi modality treatment.

SITUATION 2:

All investigations as in situation 1

- Spiral CT in elderly patients more than 80 years
- CT colonoscopy also called virtual colonoscopy – 6 mm polyps may be picked up effectively
- CEA – fetal glycoprotein

- Increased pre op CEA in node positive Ca – indication for chemotherapy

- MRI :
- PET : detection of metastasis
- SPECT – if single photon emission is studied, such as technetium or thallium
- FDG-PET – useful in evaluation of recurrent colorectal cancer

-Differentiates post op changes from recurrent / residual disease

-Useful diagnostic tool but prohibitive cost

- CT-PET – fusion tests provide the most powerful integrated images
- NUCLEAR MEDICINE IMAGING:

-Using ^{131}I , ^{111}In , $^{99\text{m}}\text{Tc}$ bound to monoclonal antibodies, leucocytes & erythrocytes.

TREATMENT:

As outlined in situation 1.

Laparoscopic resection is gaining popularity. However it is not freely available & performed as per protocols.

SPECIAL CONSIDERATIONS

1. Synchronous malignancies or polyps

Patients with synchronous malignancies should be considered for subtotal colectomy depending on the distance between lesions

Colonic cancer with multiple adenomatous polyps – subtotal colectomy

(Due to increased risk of metachronous lesion and to facilitate surveillance of the remaining colon)

Factors that influence the decision to perform prophylactic subtotal colectomy

- number
- location
- size of accompanying polyps
- age
- compliance of patient

2. Cancer is a polyp

Complete endoscopic removal of polyp with cancer in situ – no further treatment

Histopathology shows invasive carcinoma:

Ensure that endoscopic polypectomy was complete

Specimen was submitted with proper orientation to the pathologist for histopathology

Carcinoma at margin of resection requires formal resection

Carcinoma with free margins – a. thorough pathological review,

b. identification of adverse histological features

- i. poor differentiation,
- ii lymphatic or venous invasion
- iii invasion into the stock of the polyp –

formal

resection

It is difficult to locate the previous polypectomy site during surgery

Even if polyp is not removed it may be soft and difficult to palpate through the colon wall

Endoscopic distance (from anal verge or dentate line) misleading

Polypectomy site should be videotaped for later review and marked with vital dye that can be seen serosally at the time of surgery

3. Obstructing Cancers- 2% of colorectal cancers

Partial obstruction – Gentle bowel preparation over several days-Elective surgery

Total obstruction

- Rt colon cancers – Rt Hemi colectomy – immediate ileocolostomy
- Lt colon cancers

1) Endoscopic decompression by laser passed beyond the obstructed

Segment – This allows mechanical preparation and elective resection.

- This is possible only when the narrowed lumen can be traversed by the endoscope.
- It is not possible when obstruction is complete

2) Primary resection and immediate anastomosis with on-table colonic

washout with or without proximal colostomy.

3) Primary resection with colostomy. Anastomosis at second stage.

4) Subtotal colectomy with primary anastomosis

5) Decompressive colostomy followed by formal colonic resection

4. Adjacent organ involvement- 10%

Locally advanced tumours are potentially curable with multi organ resection.-Do not necessarily

Portend a dismal prognosis.

-A non metastasizing variant of colon cancer grows to a large size without spreading to regional nodes

-Separation of adhesions adjacent to a malignancy can lead to dissemination of tumour cells.

70%

-Enbloc resection of these tumours, depending on location can lead to five year survivals of

Hepatic metastases – 10% at the time of exploration.

-Solitary metastasis amenable to –wedge resection with clear margins can be removed concomitantly.

-Formal hepatic lobectomy done as a second stage procedure.

5. Ovarian metastasis – 7% at the time of colon resection

Oophorectomy: at the time of colorectal surgery

Indications

i) Large ovarian metastasis (Krukenberg's tumour) which are symptomatic (prevents second surgery for the metastasis, benefit of preventing primary ovarian cancer)

ii) Direct ovarian involvement

iii) Post menopausal women – prophylactic oophorectomy

6. Inadvertent Perforation

-Predisposes to local recurrence

-Warrants post op radiotherapy

Follow up

Aim: Early detection of recurrence or metachronous lesion

History

Physical examination

Faecal occult blood

CBC

}

every 3 months-first 3 years

LFT

every 6 months additional 2 years

Tumour markers (CEA) - monthly – 3 years, 3 monthly-next 2 years

Colonoscopy – first colonoscopy within 6-12 months of surgery, yearly-next 2 years, 2-3 yearly thereafter.

CXR

CT abdomen and pelvis – if primary loco regionally advanced

-LFT ↑

-CEA ↑

80-90% of recurrence of colon cancers occurs in the first two years.

SOP

All patients should be admitted when a colectomy is planned

WHO DOES WHAT?

Doctor:

- c) Surgeon: diagnosis & work up
 - Pre operative planning
 - Operative procedure
 - Post operative follow up
- d) Radiotherapist : radiotherapy – neoadjuvant & adjuvant
- e) Medical oncologist : Chemotherapy
- f) Anesthetist: PAC, anesthesia, post op ICU management

NURSE:

- Siting of colostomy when required by some nurse
- Care of stoma
- Dressing of the wound
- Pre & post operative care

TECHNICIAN:

- Pre op equipment and drugs to be checked and kept ready
- Assist anesthetist in the OT
- Assist the surgeon, positioning of the patient

REFERENCES

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2. National cancer Institute guidelines 2000 for colon and rectal cancer surgery. Nelson H, Sargent D, Karlin A, Couture J, Fleshman J, Guillon J, Miedema B, Ota D, Petrelli M.
3. Sages and ACRS Guidelines for laparoscopic resection of curable rectal and colon Cancer .
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Saunders | 2006 | ISBN: 1416023577

RESOURCES REQUIRED FOR ONE PATIENT / PROCEDURE (Patient weight 60 Kgs)

Situation	Human Resources	Investigations	Drugs/Consumables	Equipment
1	Surgeon – 1 Medical Officer / Assistant Surgeon – 1 Anesthetist – 1 Pathologist – 1 Staff Nurse – 1 Technician – 1 Nursing Orderly – 1	Haemogram Urine Analysis Blood Sugar S. Electrolytes KFT ECG X-Ray – Chest USG	Antibiotics Analgesic I.V. Fluids Sutures Drains Catheters Anesthetic drugs Dressings	OT Table & lights Instrument trolley General Surgery Set Cautery Suction Anesthetic Equipment

	Sweeper – 1	Histopathology	Stoma bags	Monitors
2	Consultant – 1 Residents – 1 Anesthetist – 1 Pathologist – 1 Medical Oncologist – 1 Radiotherapist – 1 Staff Nurse – 2 Stoma therapist – 1 Technician – 1 Nursing Orderly – 1 Sweeper - 1	Same as above + HbA1C CEA Coagulation Profile Colonoscopy EUS CT Scan CEA Microbiology ABG Immunology PET	Same as above	Same as above + Laparoscopic Set Harmonic Scalpel Endo GI Staplers

FISTULA IN ANO

WHEN TO SUSPECT/RECOGNIZE?

When a patient presents with a discharging opening in the perianal region, one should suspect a fistula in ano

INTRODUCTION:

A fistula is an abnormal communication between two epithelial surfaces.

DEFINITION:

By definition a fistula in ano is a communication between the anal canal and skin by a tract which may be straight and simple or complex with ramifications or a horse shoe tract involving the right and / or left halves. The discharge may be pus, fecal matter, flatus or serosanguinous.

Fistula are classified as low or high

Based upon their relationship to the anal sphincter complex, anal fistulas are categorized into:

1. Intersphincteric
2. Trans sphincteric
3. Supra sphincteric
4. Extra sphincteric

Treatment options are based upon these classifications

INCIDENCE:

Indian incidence is not documented

DIFFERENTIAL DIAGNOSIS:

Furunculosis

Crohn's disease

Pilonidal sinus

Tuberculosis

Actinomyces

Lymphogranuloma venereum

Granuloma inguinale

Perianal abscess

PREVENTION:

Adequate drainage of anorectal abscesses may prevent fistula formation

Predisposing causes

1. Crohn's disease
2. Malignancy
3. Chlamydia

In the presence of a complex, recurrent, non healing fistula these should be suspected.

COUSSELLING:

Surgical treatment alone offers permanent cure. So patients should be counseled for early surgery when it is a simple fistula so that it does not become complex.

OPTIMAL DIAGNOSTIC CRITERIA:

SITUATION 1:

CLINICAL DIAGNOSIS:

Patients with anal fistula commonly present with complaints of

- Discharge from external or internal opening, the external opening may be single or multiple
- Pain
- Swelling
- Fever

The presentation may be acute when there is acute perianal sepsis

A chronic anal fistula presents with periodic exacerbation and pus discharging openings around the anus per rectal exam and proctoscopy should be done to visualize both the internal and external openings.

This may be adequate for a straight low tract.

INVESTIGATIONS:

Fistulogram may be done when branching is suspected, in recurrent fistulae and when internal opening is not appreciable.

Examination under anesthesia

Probe test, caution may cause now internal opening

Injection technique is useful in delineating the tract

Biopsy when specific cause is anticipated

Barium enema – when co existing disease is suspected

Blood sugar – to r/o diabetes mellitus

Complete blood count

Urine r/m

X ray chest – to rule out TB

TREATMENT:

Simple low fistulae can be managed in a secondary hospital where a surgeon is available

SURGICAL PROCEDURES:

Surgical options are dictated by the type of fistula. Aim is to drain the septic focus and remove the fistula with minimal injury to the sphincter complex

Fistulotomy

Fistulectomy

Seton

Combination of the above:

Fistulotomy (of superficial position), with seton division (of the cephalad position)

Staged procedures may be required in high anal fistulae

Fistula presenting as perianal abscess would require drainage, analgesics and antibiotics followed subsequently by a definitive procedure

Fistulotomy and curettage / Fistulectomy – low anal fistula

Trans sphincteric fistula that involve \leq 30 percent of sphincteric muscle – sphincteromy without risk of incontinence

High Trans sphincteric fistulas – seton placement

REFERRAL CRITERIA:

Complex/recurrent/high anal fistulae may need referral to a higher centre for adequate investigation and management. Colostomy and staged procedure may be required.

Co existing conditions like rectal cancers, Crohn's disease, TB fistulae, HIV infection require referral

SOP:

In patient

SITUATION 2:

Clinical diagnosis as in situation 1

INVESTIGATION:

All investigations as in situation 1

Additional investigations:

MRI, MR Fistulogram in complex, high, trans sphincteric, supra and extrasphincteric fistulae

Colonoscopy – associated ulcerative colitis, carcinoma, TB etc

HIV test in suspected cases

Biopsy when multiple openings are present, malignancy or specific cause is suspected prothrombin time

HbA1C in cases of diabetes mellitus

TREATMENT: as in situation 1

Colostomy – when significant sphincter involvement is present, or non healing ulcer Multiple procedures – complex fistula with multiple tracts

SOP:

Day Care – Low fistulae – subcutaneous / submucous fistula

All others – should be admitted

WHO DOES WHAT?

Doctor:

Clinical examination

Diagnosis

Planning surgery

Post op care

Anesthesia

Nurse:

Siting of colostomy when required, by stoma nurse

Care of stoma

Dressing of the wound

Pre & post operative care

Assisting during surgery

Technician:

Pre op equipment and drugs to be checked and kept ready

Assist anesthetist in the OT

Assist the surgeon, positioning of the patient

REFERENCES

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K.Rajgopal Shenoy, Manipal Manual of Surgery second edition; reprint 2009. CBS Publishers and Distributors (Pvt.) Ltd., India

Shackelford's Surgery of the Alimentary Tract 6th Edition by Charles J. Yeo MD Saunders 2006 ISBN: 1416023577

RESOURCES REQUIRED FOR ONE PATIENT / PROCEDURE (Patient weight 60kgs)

Situation	Human Resources	Investigations	Drugs/Consumables	Equipment
1	Surgeon – 1 Medical Officer / Assistant Surgeon – 1 Staff Nurse – 1 Technician – 1 Nursing Orderly – 1 Sweeper - 1	Haemogram Urine Analysis Blood Sugar	Antibiotics Analgesics I V Fluids Sutures Anesthetic drugs Lignocaine dressings	OT Table and lights Autoclave General surgery set Cautery Suction Pulse Oximeter Anesthetic equipment
2	Consultant – 1 Resident – 1 Staff nurse – 1 Technician – 1 Nursing Orderly – 1 Sweeper - 1	Same as above + hbA1C coagulation profile ECG X-Ray chest	Same as above + stoma bag	Same as above

HAEMORRHOIDS

When to suspect / recognize?

When a patient presents with an h/o passing fresh blood per rectum

INTRODUCTION:

Three haemorrhoidal cushions are found in the left lateral, right anterior and right posterior positions of the anal canal. Bleeding results when these cushions are engorged and subjected to raised intra abdominal pressure while straining during defecation.

DEFINITION:

Haemorrhoids are cushions of submucosal tissue containing venules, arterioles and smooth muscle fibers located in the anal canal

Treatment is indicated only if they become symptomatic due to venous engorgement of the haemorrhoidal plexus

INCIDENCE:

Haemorrhoids is a common condition but the exact incidence in our country is not documented

DIFFERENTIAL DIAGNOSIS:

- Prolapsed rectum
- Anal fissure
- Anal polyp
- Carcinoma anal canal
- Rectal varices due to portal hypertension
- Perianal abscess
- Proctitis

PREVENTION AND COUNSELLING:

Excessive straining, increased intra abdominal pressure and hard stools increase venous engorgement of haemorrhoidal plexus. Avoidance of these would prevent the development of haemorrhoids

OPTIMAL DIAGNOSTIC CRITERIA:

Situation 1: Diagnosis is largely clinical

Symptoms:

- Bleeding per rectum, bright red, painless
- Anemia due to frequent bleeding
- Mass prolapsing per rectum
- Pain on prolapsed
- Mucous discharge
- Pruritus
- Skin tag

EXAMINATION:

DIRECT VISUALISATION: thrombosed/prolapsed haemorrhoids, external haemorrhoids & skin tags be visualized.

DIGITAL RECTAL EXAMINATION:

Thrombosed haemorrhoids, as well as other associated conditions such as anal cancer, BPH may be felt per rectum.

PROCTOSCOPY:

Internal haemorrhoids occur in 3, 7 & 11 “o” clock positions. These are visualized during proctoscopy. Haemorrhoids are classified into 4 grades by descent

Grade Presentation

1. Bleeding
2. Protrusion below the anal verge while straining with spontaneous reduction
3. Protrusion regressing with manual reduction
4. Irreducible protrusions

Based on their location, haemorrhoids can be classified into

External – located distal to dentate line, covered by anoderm, painful, arise from inferior haemorrhoidal plexus

Internal – located proximal to dentate line, covered by insensate anorectal mucosa, painless, may prolapsed or bleed

Interno – external – features of both

INVESTIGATIONS:

Hb

Peripheral smear

TLC, DLC, ESR

Blood grouping and Rh typing

USG abdomen

TREATMENT:

MEDICAL:

- Laxatives
- Haematinics if anemia is present
- Sitz bath
- Ointment
- Antibiotics when infection or complications are present
- Emergency transfusion when presentation is of profuse haemorrhage or severe anaemia due to chronic blood loss

SURGICAL:

I. Minor Outpatient procedures:

1. Sclerotherapy – for grade 1 & II haemorrhoids and bleeding haemorrhoids

2 to 5 ml of 5% phenol in almond oil injected around pedicle in the submucosa aseptically

2. Banding – gr II & III haemorrhoids by modified Barron's band applicator above the dentate line

II. In patient

GR III & IV haemorrhoids

1. Haemorrhoidectomy
 - Open: MILLIGAN – MORGAN operation
 - Closed: HILL – FERGUSON operation
2. Excision of thrombosed pile mass:

ANESTHESIA: GA/Spinal/Caudal block

REFERRAL CRITERIA:

Patients who opt for stapled haemorrhoidopexy

Patients with portal hypertension

Patients with bleeding disorders

Patients with co-morbidities that may require ICU care

SOP

Outpatient / day care procedures: Minor procedures for Grade I & II

In Patient: Operative procedures for Grade III & IV

Situation 2:

CLINICAL DIAGNOSIS – Same as in situation 1

INVESTIGATIONS – As in situation 1

+

Colonoscopy – to r/o other conditions (malignancy) and co-existing when required

Coagulation profile

TREATMENT

As in situation 1 &

Outpatient procedures:

1. Photocoagulation – 1&II degree haemorrhoids

Infrared coagulation probe applied to the apex of each haemorrhoid to coagulate the underlying venous plexus

In-patient procedures:

1. Stapled haemorrhoidectomy: for grade III haemorrhoids. May be done as a day care procedure or as an in-patient

SOP:

In-patient

Day care procedure – depending on the education and awareness of the patient

WHO DOES WHAT? AND TIMELINES

a. **Doctor**

- Clinical examination
- Diagnosis
- Planning surgery
- Surgery

- Post op care
- Anesthesia

b. Nurse

- Pre & post operative care
- Assisting during surgery

c. Technician

- Pre operatively equipment and drugs to be checked and kept ready
- Assist anesthetist in the OT
- Assist the surgeon, positioning of the patient

REFERENCES

Bailey and Love's Short Practice of Surgery 25th edition

Shackelford's Surgery of the Alimentary Tract 6th Edition by Charles J. Yeo MD Saunders 2006 ISBN: 1416023577

RESOURCES REQUIRED FOR ONE PATIENT / PROCEDURE (Patient weight 60 Kgs)

Situation	Human Resources	Investigations	Drugs/Consumables	Equipment
1	Surgeon – 1 Medical Officer / Assistant Surgeon - 1 Staff Nurse – 1 Technician – 1 Nursing Orderly – 1 Sweeper - 1	Haemogram Urine Analysis Blood sugar	Antibiotics Analgesics IV fluids Sutures Anesthetic drugs lignocaine	OT Table & lights Autoclave General surgery set Cautery Suction Anesthesia equipment
2	Consultant – 1 Resident – 1 Staff nurse – 1 Technician – 1 Nursing orderly -1 Sweeper - 1	Same as above + HbA1C Coagulation Profile ECG X-Ray chest	Same as above	Same as above

HERNIA

I. Introduction

A hernia is an area of weakness or disruption of the fibromuscular tissue of body wall. Often hernia is also defined as an actual anatomical weakness or defect. Strictly it is defined as “an abnormal protrusion of a viscus or a part of viscous through an opening – artificial or natural with a sac covering it.

II. Incidence

75% of the abdominal hernias are groin hernia.

15 % males and 5% females will develop groin hernia.

Femoral hernia incidence is 17%.

Incidence of Umbilical hernia is 8.5%.

Others type of hernias are seen in 1.5%.

These figures exclude incisional hernias which can form after any surgery through abdominal wall or lumbar area.

III. Differential Diagnosis

- a. Hydrocele – Infantile, Encysted, Large vaginal and bilocular – absence of cough impulse, getting above the swelling and transillumination. The swelling is not reducible.
- b. Undescended testis – the corresponding half of the scrotum is empty and underdeveloped.
- c. Femoral Hernia- the sac is below and laterals to the pubic tubercle.
- d. Lipoma of cord – the localized swelling moves with pulling of the spermatic cord. Cough impulse is absent and the swelling can not be reduced.
- e. Groin abscess- May mimic small strangulated hernia. Signs of acute inflammation are present. Cough impulse is absent and it can not be reduced.

IV. Prevention and Counseling

No specific preventive measures except in incisional hernia where various factor can lead to development of incisional hernia.

All patients having hernia other than direct inguinal hernia or hernia with wide neck are counseled to undergo surgery at the earliest convenience to prevent any chance of complications like obstruction and strangulation etc.

V. Optimal diagnostic criteria, Investigations, Treatment and referral criteria (Situation 1)

a) CLINICAL DIAGNOSIS

A swelling in groin or abdominal wall exhibiting cough impulse and showing sign of reducibility is clinically diagnosed as hernia. The clinical spectrum includes :-

- Epigastric hernia exhibiting above features in a swelling in epigastric region.
- Umbilical and para-umbilical hernia- in umbilical and para-umbilical area.

- Incisional hernia or ventral hernia
- Inguinal hernia (Direct ,Indirect and Congenital hernia) presenting in groin area.
- Femoral hernia also presenting as a swelling of variable dimension in groin area.
In congenital hernia the inguino-scrotal swelling is present since birth or during childhood .

b) INVESTIGATIONS

In most of the cases practically no investigations are required to confirm the diagnosis of hernia. Clinical diagnosis is enough. Ultrasound of whole abdomen may be done in cases of hernia to rule out other abdominal pathology .

c) TREATMENT

- i. In-Patient – Principles of Hernia surgery include reduction of hernia , excision of the sac and repair of wall. Repair may be done by suture or mesh.
 - Congenital inguinal hernia_ is treated by herniotomy alone.
 - Direct and indirect inguinal hernia is treated by herniorrhaphy or hernioplasty using a mesh by various techniques.
 - Epigastric hernia with small defect may be treated by suture repair using double breasting technique . When the defect is large , hernioplasty using a mesh may be done.
 - Umbilical and Para-umbilical hernia – approach is same as for epigastric hernia.
 - Femoral hernia – Same principles of hernia repair are applied by High, Low or inguinal approach depending upon the case and expertise of surgeon.
 - Incisional hernia – An anatomical repair or mesh repair may be considered depending upon individual case and expertise of the surgeon.
- ii. Out-patient – None
- iii. Day-care – In appropriate situation and setting viz local anesthesia, small size hernia , patient residing within approachable distance etc . day care practice may be considered.

d) REFERRAL CRITERIA

Referral can be considered from situation 1 in hernia only if the patient has associated severe co-morbidities requiring special care.

Optimal diagnostic criteria, Investigations, Treatment and referral criteria (Situation 2)

a) CLINICAL DIAGNOSIS

Same as situation 1.

b) INVESTIGATIONS

Same as situation 1.

c) TREATMENT

- i. In-patient – Same as for situation 1. In addition, patient can be offered laparoscopic repair , particularly in bilateral and recurrent hernia after informed patient consent provided that the infrastructure, equipment and expertise is available.
- ii. Out-patient – None
- iii. Day-care – Same as situation 1.

d) REFERRAL CRITERIA

None

VI. Who does what ? and timelines

a. Doctor

➤ The job of diagnosis, treatment including surgery, post-operative care and follow up.

b. Nurse

➤ Pre-operative care, operative assistance, post-operative care, administration of treatment instructed by the doctor and monitoring as instructed.

c. Technician

➤ Keeps all machines and equipments in order and assist the anesthetist during operation.

VII. Further reading

1. Bailey & Love's Short Practice of Surgery
2. Schwartz's Textbook of Surgery
3. Abdominal Operations by Maingot

Resources required for one patient/procedure

Situation	Human resources	Investigations	Drugs etc	Equipment
1	Surgeon – 1 Medical officers - 2 Staff Nurses -2 Technician – 1 Ward boy -1 Sweeper - 1	X-ray USG Biochemistry Hematology Urine analysis	I/V fluids, Broad spectrum antibiotics, analgesics, Vasopressors, anesthesia drugs, sutures, Mesh, drains & catheters, O2 cylinder etc	General surgery set, Anesthesia equipment Monitors, Cautery, Suction, OT Tables & lights, Autoclave, Trolleys
2	Consultant – 1 Sr. Resident – 1 Jr. Resident -2 Staff Nurses -2 Technician – 1 Ward boy -1 Sweeper - 1	Same as above plus Microbiology ABG	Same as above plus HDU/ICU back up	Same as above plus all equipment for HDU/ICU, Laparoscope

HYDROCELE

I. Introduction

Hydrocele is collection of fluid between two layers of tunica vaginalis of testis. It can be congenital or acquired which is further of two types i.e. primary or secondary.

II. Incidence

Hydrocele is quite a common condition with little high incidence in zones or areas affected by filariasis. Those present since birth are called congenital hydrocele where the processus vaginalis is essentially patent. Secondary hydrocele is most commonly due to tuberculosis, malignancy or chronic infection.

III. Differential Diagnosis

Primary hydrocele in adults has to be differentiated from

- a. Inguinal Hernia- One can not get above swelling and transillumination is absent (except congenital hernia).
- b. Epididymal cyst – The testis is palpable separately.
- c. Spermatocele – The testis is palpable separately.
- d. Testicular tumor - The consistency is firm to hard, Testicular sensation and fluctuations are absent and transillumination can not be elicited.

IV. Prevention and Counseling

There are no specific preventive measures for both congenital and adult hydrocele except that wherever filariasis is endemic or prevalent, anti filarial prophylaxis may be taken or whenever the person suffers from it, prompt and proper treatment should be taken.

V. Optimal diagnostic criteria, Investigations, Treatment and referral criteria (Situation 1)

a) CLINICAL DIAGNOSIS

For primary hydrocele in adults, 3 classical signs i.e. can get above the swelling, presence of fluctuations and transillumination are diagnostic of hydrocele. Secondary hydrocele is generally very small and soft and signs of primary pathology may be present. In congenital variety, classical history of no scrotal swelling in morning and full blown swelling in the evening coupled with above signs is diagnostic.

b) INVESTIGATIONS

In most of the cases practically no investigations are required to confirm the diagnosis of primary hydrocele and congenital hydrocele. At the most, ultrasound may be done to find out testicular morphology . For secondary hydrocele , complete battery of investigation consisting of ultrasound, FNAC, CT scan and investigations for tuberculosis and tumor markers etc will be required depending upon the possible primary pathology.

This battery is unlikely to be available in situation 1; hence referral to higher centre would be advisable.

c) TREATMENT

- i. In-Patient – Congenital hydrocele is treated surgically by herniotomy through inguinal approach.
Adult hydrocele (primary) is treated by eversion or excision or plication depending upon size of hydrocele and thickness of the sac. Since hematoma is a very common complication, hence perfect hemostasis must be achieved in this surgery.
- ii. Out-patient – None.
- iii. Day-care – For congenital hydrocele, overnight stay is routine. For adult hydrocele, in appropriate setting, the operative procedure can be considered on day care basis if surgery has been done under local anesthesia.

d) REFERRAL CRITERIA

Referral may be considered in secondary hydrocele if the primary cause turns out to be testicular malignancy.

Optimal diagnostic criteria, Investigations, Treatment and referral criteria (Situation 2)

a) CLINICAL DIAGNOSIS

Same as situation 1.

b) INVESTIGATIONS

Same as situation 1.

c) TREATMENT

- i. In-patient – Same as situation 1.
- ii. Out-patient – None
- iii. Day-care – All the surgical options mentioned for congenital and primary variety of adult hydrocele can be considered on day care basis in situation 2.

d) REFERRAL CRITERIA

None

VI. Who Does What? and Timelines

a. Doctor

➤ The job of diagnosis, treatment including surgery, post-operative care and follow up.

b. Nurse

- Pre-operative care, operative assistance, post-operative care, administration of treatment instructed by the doctor and monitoring as instructed.
- c. Technician
- Keeps all machines and equipments in order and assist the anesthetist during operation.

VII. Further reading

1. Bailey & Love's Short Practice of Surgery
2. Schwartz's Textbook of Surgery

Resources required for one patient/procedure

Situation	Human resources	Investigations	Drugs etc	Equipment
1	Surgeon – 1 Medical officer -1 Staff Nurses -1 Technician – 1 Ward boy -1 Sweeper - 1	X-ray USG Biochemistry Hematology Urine analysis	I/V fluids, Broad spectrum antibiotics, analgesics, Vasopressors, anesthesia drugs, sutures, drains & catheters, O2 cylinder etc	General surgery set Anesthesia equipment Monitors, Cautery, Suction, OT Tables & lights, Autoclave, Trolleys
2	Consultant – 1 Jr. Resident -2 Staff Nurses -1 Technician – 1 Ward boy -1 Sweeper - 1	Same as above plus CT Scan , Pathology, Immunology, Microbiology ABG	Same as above plus	Same as above

PAROTID NEOPLASM

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- 1. Name of the condition:** Parotid neoplasm
- 2. When to suspect/ recognize?**
 - a. Introduction: Parotid gland is the commonest site of salivary gland neoplasms.
 - b. Case definition: Neoplasms of parotid gland may be benign or malignant.
- 3. Incidence of the condition in our country:** Not reported
- 4. Differential diagnosis:** Skin, soft tissue and lymph node swellings form an important differential diagnosis of parotid neoplasm.
- 5. Prevention and counseling:** Parotid lesions should be investigated and treated early to prevent morbidity of facial nerve injury and mortality due to advanced parotid malignancy.
- 6. Optimal diagnostic criteria, investigations, treatment and referral criteria**

Situation 1 At Secondary Hospital/ Non-metro situation: Optimal standard of treatment in situations where resources are limited

- I. Clinical diagnosis:
 - a. Painless, slow growing swelling in front of or below the ear. Occasionally, there may be a bulge in the tonsillar region if deep lobe is involved. Presence of pain or facial paralysis may suggest malignancy.
- II. Investigations:
 - a. Fine Needle Aspiration Cytology is necessary to confirm the diagnosis and as a prelude to radical parotidectomy.
- III. Treatment (Standard operating procedure)
 - a. Inpatient:
 - i. Superficial parotidectomy is the treatment of choice for benign neoplasms located in the superficial lobe of parotid.
 - ii. Isolated deep parotidectomy or total parotidectomy with preservation of facial nerve is indicated for benign neoplasms located in the deep lobe of parotid.
 - iii. For malignant neoplasms of the parotid gland total parotidectomy with excision of adjacent involved structures, facial nerve and ipsilateral neck dissection, if required, should be done.
 - b. Outpatient: Not indicated
 - c. Day care: Not indicated
- IV. Referral criteria: Patient should be referred to a higher center if frozen section or nerve grafting of the facial nerve are anticipated.

Situation 2 At Superspecialty Facility in Metro location where higher end technology is available

- I. Clinical diagnosis:
 - a. Painless, slow growing swelling in front of or below the ear. Occasionally, there may be a bulge in the tonsillar region if deep lobe is involved. Presence of pain or facial paralysis may suggest malignancy.
- II. Investigations:
 - a. Fine Needle Aspiration Cytology is necessary to confirm the diagnosis and as a prelude to radical parotidectomy.
 - b. CECT/ MRI should be done to evaluate the nature of lesion, involvement of adjacent structures and presence of significant lymphadenopathy.
- III. Treatment (Standard operating procedure)
 - a. Inpatient:
 - i. Superficial parotidectomy is the treatment of choice for benign neoplasms located in the superficial lobe of parotid.
 - ii. Isolated deep parotidectomy or total parotidectomy with preservation of facial nerve is indicated for benign neoplasms located in the deep lobe of parotid.
 - iii. For malignant neoplasms of the parotid gland total parotidectomy with excision of adjacent involved structures, facial nerve and ipsilateral neck dissection, if required, should be done.
 - iv. Ipsilateral neck dissection is indicated in the presence of significant lymphadenopathy.
 - v. Frozen section biopsy is indicated if operative findings are suspicious of malignancy, even if it was not suspected preoperatively.
 - vi. Nerve grafting should be done when facial nerve needs excision.
 - b. Outpatient: Not indicated
 - c. Day care: Not indicated
- IV. Referral criteria: Not indicated

7. Who does what and timelines:

- a. Doctor: Clinical evaluation, treatment planning and execution.
- b. Nurse: Assisting in evaluation and treatment.
- c. Technician: Assisting in investigations and operation.

8. Further reading/ references:

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- b. Meyers MN, Ferris RL (Eds.). Salivary gland disorders. Springer Verlag Berlin 2007.

PEPTIC ULCER PERFORATION

Dr. Arun Prasad

INTRODUCTION:

Lau and Leow have indicated that perforated peptic ulcer was clinically recognized by 1799, but the first successful surgical management of gastric ulcer was by Ludwig Heusner in Germany in 1892. In 1894, Henry Percy Dean from London was the first surgeon to report successful repair of a perforated duodenal ulcer. Wangenstein et al reported that in a patient with perforation but without evidence of pneumoperitoneum, one can safely assume that perforation has sealed off on its own. They advocated a nonoperative approach for such patients. However, they too supported operative treatment in patients with perforated ulcer and evidence of pneumoperitoneum.

Berne and Donovan emphasized the use of a water-soluble upper GI study to demonstrate spontaneous sealing of the perforation. They demonstrated that as many as 40% of perforated peptic ulcers had no evidence of leak on upper GI contrast studies. Berne and Donovan concluded that these patients can be observed safely as long as peritonitis does not develop. Mortality rates were 6% and 3% in the operative and nonoperative groups, respectively.

Donovan et al proposed dividing patients based on their *Helicobacter pylori* infection status and recommended nonoperative treatment in all patients except those without *H pylori* infection and those in whom prior treatment of *H pylori* infection had failed.

Despite strong arguments favoring nonoperative treatment of patients with perforated PUD, delaying the initiation of surgery more than 12 hours after presentation was demonstrated to worsen the outcome. Therefore, when definitely indicated, a laparotomy should be performed as soon as possible.

INDIAN INCIDENCE

There are no statistics available on this topic.

SYMPTOMS

- Sudden, sharp and severe pain in upper abdomen
- Spreading of pain to rest of abdomen
- Pain gets worse after oral ingestion or movements
- Feeling of giddiness and fainting
- Fever
- Weakness

SIGNS

Tachycardia
Fever
Pallor

Reduced abdominal wall movements

COMPLICATIONS

INVESTIGATIONS

- Haemogram
- Liver Function Tests
- Blood sugar
- Serum creatinine
- Bleeding time, clotting time and prothrombin time
- Xray chest
- ECG
- USG abdomen
- Upper GI endoscopy

MANAGEMENT

Resuscitation

Fluid resuscitation should be initiated as soon as the diagnosis of peptic ulcer disease (PUD) is made. Essential steps include insertion of a nasogastric tube to decompress the stomach and a Foley catheter to monitor urine output. Intravenous infusion of fluids is begun, and broad-spectrum antibiotics are administered. In select cases, insertion of a central venous line or a Swan-Ganz catheter may be necessary for accurate fluid resuscitation and monitoring. As soon as the patient has been adequately resuscitated, emergent exploratory laparotomy should be performed.

Conservative Treatment

Wangensteen et al reported that in a patient with perforation but without evidence of pneumoperitoneum, one can safely assume that perforation has sealed off on its own. They advocated a nonoperative approach for such patients. However, they too supported operative treatment in patients with perforated ulcer and evidence of pneumoperitoneum.

Berne and Donovan emphasized the use of a water-soluble upper GI study to demonstrate spontaneous sealing of the perforation. They demonstrated that as many as 40% of perforated peptic ulcers had no evidence of leak on upper GI contrast studies. Berne and Donovan concluded that these patients can be observed safely as long as peritonitis does not develop. Mortality rates were 6% and 3% in the operative and nonoperative groups, respectively.

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Despite strong arguments favoring nonoperative treatment of patients with perforated PUD, delaying the initiation of surgery more than 12 hours after presentation was demonstrated to worsen the outcome. Therefore, when definitely indicated, a laparotomy should be performed as soon as possible

Surgical Treatment

The appropriate surgical procedure depends on the location and nature of the ulcer. Many authorities recommend simple oversewing of the ulcer, with treatment of the underlying H pylori infection or cessation of nonsteroidal anti-inflammatory drugs (NSAIDs) for bleeding PUD. Additional surgical options for refractory or complicated PUD include vagotomy and pyloroplasty, vagotomy and antrectomy with gastroduodenal reconstruction (Billroth I) or gastrojejunal reconstruction (Billroth II), or a highly selective vagotomy.

The patient is placed in the supine position. A midline incision provides the most expeditious entry into the abdominal cavity. The incision can be extended to the symphysis pubis if necessary.

Once the abdomen is entered, the stomach and duodenum are carefully examined to determine the site of perforation. If the anterior surfaces of the stomach and duodenum show no abnormalities, the gastrocolic ligament is serially divided between clamps to allow entrance into the lesser sac and inspection of the posterior surface of the stomach.

The choice of operative procedure depends on variables such as the presence of shock, the presence of life-threatening comorbid conditions, the degree of contamination of the upper abdomen, the amount and duration of perforation, and whether the patient has a history of, or currently has intraoperative evidence of, chronic peptic ulceration.

In the presence of life-threatening comorbid conditions and severe intra-abdominal contamination, the safest technique for an acute anterior duodenal perforation is a simple closure with a Graham patch, using omentum. Several full-thickness simple sutures are placed across the perforation, using 2-0 or 3-0 silk sutures. A segment of omentum is placed over the perforation. The silk sutures are secured.

If contamination of the upper abdomen is minimal and the patient is stable, a definitive ulcer procedure can be performed. For a perforated duodenal ulcer, this may include a highly selective vagotomy, a truncal vagotomy and pyloroplasty, or vagotomy and antrectomy.

For a perforated gastric ulcer, the procedure performed depends on the patient's condition. If the patient is moribund, the ulcer is best excised by grasping it with multiple Allis clamps and using a linear stapler. Alternatively, the ulcer can be excised with electrocautery; the defect is approximated with a 2-layer closure with inner continuous 3-0 absorbable sutures and outer interrupted Lambert sutures using 2-0 or 3-0 silk sutures.

In a stable patient, the ulcer is excised and sent for frozen section analysis to exclude malignancy. For a benign gastric ulcer, a distal gastrectomy with either a Billroth I gastroduodenostomy or a Billroth II gastroduodenostomy is performed.

Post Operative Care & Complications

The nasogastric tube can be discontinued on postoperative day 2 or 3, depending on the return of GI function, and diet can be slowly advanced. Patients who are found to have H pylori infection should receive the appropriate antibiotic regimen. Patients with high serum gastrin levels should undergo an evaluation for Zollinger-Ellison syndrome. Patients should undergo upper endoscopy to evaluate the area of ulcer and healing of the perforation site 4-6 weeks after surgery.

Surgical complications include pneumonia (30%), wound infection, abdominal abscess (15%), cardiac problems (especially in those >70 y), diarrhea (30% after vagotomy), and dumping syndromes (10% after vagotomy and drainage procedures).

REFERRAL CRITERIA:

- ICU care may be needed in patients who present late with severe sepsis and have other systemic illnesses.
- Patients with recurrence of perforation few days after surgery may need ICU care, parenteral nutrition, investigations for gastrinoma and further surgery.

MEDICOLEGAL:

- Failure to detect / investigate or refer a patient of suspected peptic ulcer perforation.
- Delay in treatment.
- Delay in diagnosing complications and taking corrective action.

WHO DOES WHAT?

Doctor:

g) Surgeon: diagnosis & work up
Pre operative planning

Operative procedure

Post operative follow up

h) Anesthetist: PAC, anesthesia, post op ICU management

NURSE:

- Dressing of the wound
- Pre & post operative care

TECHNICIAN:

- Pre op equipment and drugs to be checked and kept ready
- Assist anesthetist in the OT
- Assist the surgeon, positioning of the patient

RESOURCES REQUIRED FOR ONE PATIENT / PROCEDURE (Patient weight 60 Kgs)

Human Resources	Investigations	Drugs/Consumables	Equipment
Surgeon – 1	Haemogram	Antibiotics	OT Table & lights
Medical Officer /	LFT	Analgesic	Instrument trolley
Assistant Surgeon – 1	Blood Sugar	I.V. Fluids	Laparoscopic Surgery set
Anesthetist – 1	S. Electrolytes	Sutures	General Surgery Set
Pathologist – 1	KFT	Drains	Cautery
Staff Nurse – 1	ECG	Catheters	Suction
Technician – 1	X-Ray – Chest	Anesthetic drugs	Anesthetic Equipment
Nursing Orderly – 1	USG	Dressings	Monitors
Sweeper – 1	Histopathology		

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SKIN AND SOFT TISSUE LESIONS

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1. **Name of the condition:** Skin and subcutaneous lesions
2. **When to suspect/ recognize?**
 - a. Introduction: There are a large number of skin and subcutaneous lesions, both benign and malignant. The aim of the surgeon is to identify those which are malignant or carry malignant potential and institute appropriate treatment.
 - b. Case definition: All lesions identified clinically as occurring in skin or subcutaneous tissue.
3. **Incidence of the condition in our country:** The condition is very common. However, the exact incidence is not reported.
4. **Differential diagnosis:**

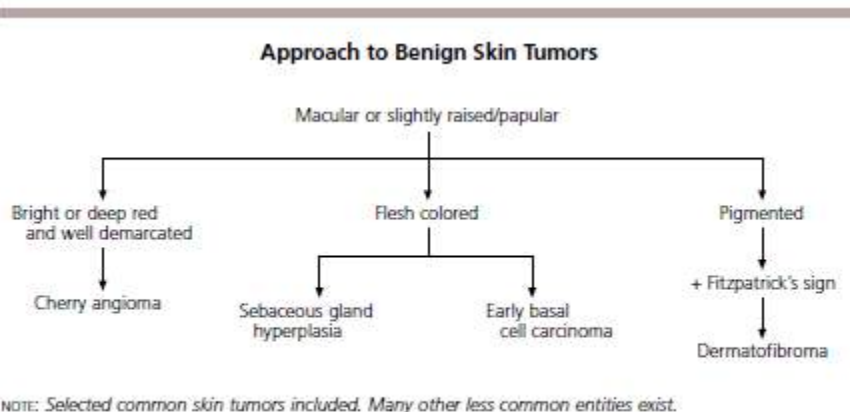
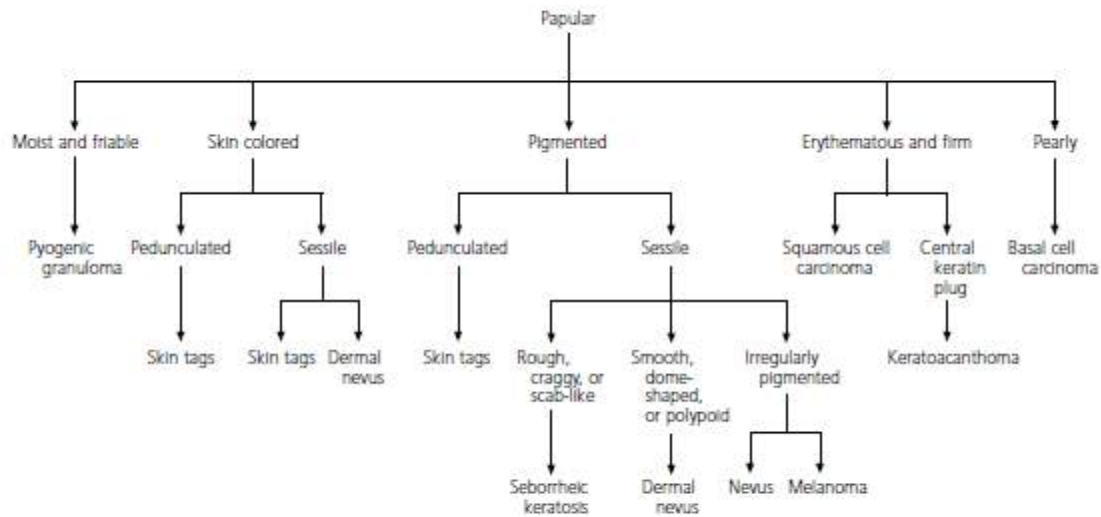


FIGURE 1. Algorithm for the diagnosis of benign skin tumors (macular or slightly raised/papular).

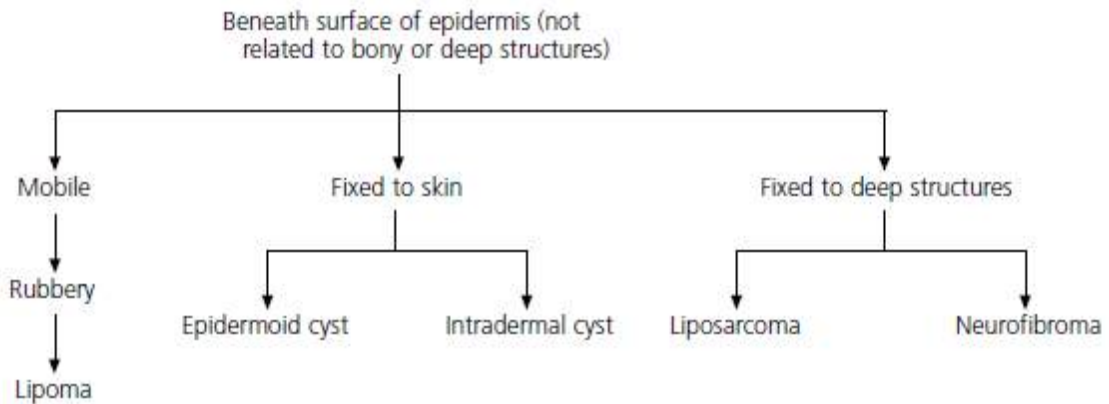
Approach to Benign Skin Tumors (Papular)



NOTE: Selected common skin tumors included. Many other less common entities exist.

FIGURE 2. Algorithm for the diagnosis of benign skin tumors (papular).

Approach to Benign Skin Tumors (Subepidermal)



NOTE: Selected common skin tumors included. Many other less common entities exist.

FIGURE 3. Algorithm for the diagnosis of benign skin tumors (subepidermal).

5. **Prevention and counseling:** Specific to each lesion
6. **Optimal diagnostic criteria, investigations, treatment and referral criteria:**
 - a. **Situation 1 At Secondary Hospital/ Non-metro situation: Optimal standard of treatment in situations where resources are limited**

- V. Clinical diagnosis: Based on clinical features specific for each lesion.
- VI. Investigations:
 - a. FNAC
 - b. Incision biopsy (for larger lesions)
 - c. Excision biopsy (for smaller lesions)
- VII. Treatment (Standard operating procedure)
 - a. Inpatient: Not indicated
 - b. Outpatient/ Day care: These lesions can be treated on day care or outpatient basis. All lesions do not need treatment.
 - i. Confirm diagnosis by investigations
 - ii. Excise the lesion under LA with appropriate margin.
 - iii. For large lesions or in children general anesthesia may be used.
 - iv. Skin is closed by primary suturing/ grafting.
- VIII. Referral criteria: Not indicated.

b. Situation 2 At Superspecialty Facility in Metro location where higher end technology is available: Same as "a"

- V. Clinical diagnosis
- VI. Investigations
- VII. Treatment (Standard operating procedure)
 - a. Inpatient
 - b. Outpatient
 - c. Day care
- VIII. Referral criteria

7. Who does what and timelines

- a. Doctor: Clinical diagnosis, investigations and treatment
- b. Nurse: Assisting the surgeon in investigations and treatment
- c. Technician: Assisting in investigations and treatment

8. Further reading/ references:

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SMALL BOWEL PERFORATIONS

I. Introduction

Small perforation is breach in seromuscular continuity of small intestine ie from D-J junction to ileocaecal junction. It can be single or multiple and of varying sizes depending on nature and stage of pathology causing it. It may even be associated with gangrenous segment of variable length of small intestine.

II. Incidence of the condition in our country

In India, the commonest cause of small bowel perforation is enteric fever and tuberculosis. Rapidly increasing incidence of vehicular trauma contributes to another category of perforation called traumatic perforation. Penetrating injury caused by knife, gunshot etc also adds to the etiology of these perforations. Rarely these perforations can be associated with long standing small intestinal volvulus or near the site of band compressing the gut causing ischemia and perforation. Iatrogenic perforations too can occur during conduct of various other abdominal operations and even gynecological operations.

III. Differential diagnosis

The common conditions that should be considered in any patient presenting with features of peritonitis (apart from small bowel perforations):-

1. Acute Pancreatitis
2. Duodenal perforation
3. Appendicular perforation with peritonitis
4. Mesenteric vascular ischemia

IV. Prevention and counseling

Timely medical advice and treatment for conditions like enteric fever and tuberculosis. In case of injury whether blunt or penetrating, seek hospitalization without any delay. Using of seat belts during travel (wherever possible) is also a good preventive step

V. Optimal diagnostic criteria, Investigations, Treatment & Referral Criteria(Situation 1)

a. Clinical diagnosis

- Small bowel perforation is suspected clinically in any patient presenting with history of fever, trauma, abdominal pain, vomiting, distension of tummy, inability to pass flatus and feces of variable duration depending on type and duration of pathology.
- Clinical examination will reveal features of peritonitis which is mostly generalized but rarely may be localized also. Hippocratic facies will be present. The patient may be in shock (hypovolemic or septic) or may even be having septicemia at the time of presentation.

b. Investigations

- Plain X-ray abdomen in erect posture shows gas under one or both domes of diaphragm
- USG evidence of fluid collection showing internal echoes
- Abdominal paracentesis, not routinely but only where X-ray provides some doubt
- Additional serological tests like Widal may be carried out.

c. Treatment (Standard operating procedure)

i. In Patient

- Hospitalization followed by resuscitation followed by investigation followed by optimization for surgery which essentially consists of
 - Laparotomy
 - Closure of perforation/Ileostomy/resection and anastomosis depending on condition of the patient, condition of the bowel, location and multiplicity of pathology.(If single perforation with healthy bowel and condition of the patient is not bad, primary closure; otherwise ileostomy. In the event of multiple perforations with healthy bowel and good condition of the patient, resection and anastomosis; otherwise ileostomy is advised. Once a while exteriorization may be considered if the condition of bowel and patient demands this procedure)
 - Thorough peritoneal lavage
 - Closure after providing adequate drainage tubes

Postoperative

Care in ward and involves

- I/V fluids, antibiotics, pain killers and monitoring
- Oral allowance after bowel movements
- Stitch removal at appropriate time

ii. Outpatient None

iii. Day Care None

d. Referral criteria

- If any of the facilities, infrastructure or expertise to carry out any of the above step is not available either at diagnostic level or treatment level or at the level of post-operative care, then the case must be referred to higher centre.

Optimal diagnostic criteria, Investigations, Treatment & Referral Criteria (Situation 2)

a. Clinical diagnosis

- Same as in situation 2

b. Investigations

- Same as in situation 1 plus CT scan and diagnostic laparoscopy if any equivocality is involved despite already mentioned investigations.

c. Treatment (Standard operating procedures)

i. In Patient

- Same as in Situation 1 with addition of Laparoscopic procedure in following situations:
 - Facilities and infrastructure available

- Expertise is available
- Post-operative care of the patient in HDU or ICU if the patient is unstable .
 - ii. Out patient – None
 - iii. Day care – None
- d. Referral criteria – None from situation 2

VI. Who does what and Timeliness?

- a. Doctor
 - The job of diagnosis, treatment including surgery, post-operative care and follow up.
- b. Nurse
 - Pre-operative care, operative assistance, post-operative care, administration of treatment instructed by the doctor and monitoring as instructed.
- c. Technician
 - Keeps all machines and equipments in order and assist the anesthetist during operation.

VII. Further reading

- a. Bailey & Love’s Short Practice of Surgery
- b. Schwartz’s Textbook of Surgery
- c. Abdominal Operations by Maingot

Resources required for one patient/procedure

Situation	Human resources	Investigations	Drugs etc	Equipment
1	Surgeon – 1 Medical officers - 2 Staff Nurses -2 Technician – 1 Ward boy -1 Sweeper - 1	X-ray USG Biochemistry Hematology Urine analysis	I/V fluids, Broad spectrum antibiotics, analgesics, Vasopressors, anesthesia drugs, sutures, drains & catheters, O2 cylinder etc	Exploratory laparotomy equipments Anesthesia equipment Monitors, Cautery, Suction, OT Tables & lights, Autoclave, Trolleys
2	Consultant – 1 Sr. Resident – 1 Jr. Resident -2 Staff Nurses -2 Technician – 1 Ward boy -1 Sweeper - 1	Same as above plus Microbiology ABG	Same as above plus HDU/ICU back up	Same as above plus all equipment for HDU/ICU, Laparoscope

VARICOSE VEINS SURGERY

Dr. Arun Prasad

INTRODUCTION:

The description of varicose veins as a clinical entity can be traced back as early as the fifth century BC. Forefathers of medicine including Hippocrates and Galen described the disease and treatment modalities, which are still used today. Throughout the centuries, surgical treatments have evolved from large, open surgeries to minimally invasive approaches. Varicose veins represent a significant clinical problem and are not just a “cosmetic” issue because of their unsightly nature. The problem arises from the fact that varicose veins actually represent underlying chronic venous insufficiency with ensuing venous hypertension. This venous hypertension leads to a broad spectrum of clinical manifestations, ranging from symptoms to cutaneous findings like varicose veins, reticular veins, telangiectasias, swelling, skin discoloration, and ulcerations.

DEFINITION:

When veins become abnormally thick, full of twists and turns, or enlarged, they are called varicose veins. Generally, the veins in the legs and thighs have a tendency to become varicosed.

INDIAN INCIDENCE

In India, the incidence of varicose veins is reportedly less than in the Western countries. This could be genuinely less or underreported as culturally the society does not permit exposure of legs and therefore it may not be bothering many people.

INDICATIONS:

Surgical removal or obliteration of varicose veins is often for cosmetic reasons alone. Noncosmetic indications include symptomatic varicosities (e.g., pain, fatigability, heaviness, recurrent superficial thrombophlebitis, bleeding), or for the treatment of venous hypertension after skin or subcutaneous tissue changes, such as lipodermatosclerosis, atrophie blanche, ulceration, or hyperpigmentation, have developed.

Conservative treatment with stockings and external compression is an acceptable alternative to surgery, but worsening cutaneous findings or symptoms despite these measure usually warrant intervention. Nonetheless, a patient's desire for surgical management over conservative treatment or for cosmetic purposes alone are both reasonable relative indications for surgery.

TESTS FOR REFLUX

Trendelenburg test: This physical examination technique distinguish patients with reflux at the SFJ from those with incompetent deep venous valves. The leg is elevated until the congested superficial veins have all collapsed. Direct pressure is used to occlude the GSV just below the SFJ. The patient stands with the occlusion still in place. If the distal superficial varicosities remains empty or fills very slowly, the

principal entry point of high pressure into the superficial system is at the SFJ. Rapid filling despite manual occlusion means that some other reflux pathway is involved.

Doppler auscultation: A Doppler transducer is positioned along the axis of a vein with the probe at an angle of 45° to the skin. When the distal vein is compressed, audible forward flow exists. If the valves are competent, no audible backward flow is heard with the release of compression. If the valves are incompetent, an audible backflow exists. These compression-decompression maneuvers are repeated while gradually ascending the limb to a level at which the reflux can no longer be appreciated.

Venous refilling time (VRT): This is a physiologic test, again using plethysmography. The VRT is the time necessary for the lower leg to become infused with blood after the calf-muscle pump has emptied the lower leg as thoroughly as possible. In healthy subjects, venous refilling is greater than 120 seconds. In patients with mild and asymptomatic venous insufficiency, VRT is between 40 and 120 seconds. In patients with significant venous insufficiency, VRT is abnormally fast at 20-40 seconds. Such patients often complain of nocturnal leg cramps, restless legs, leg soreness, burning leg pain, and premature leg fatigue. A VRT of less than 20 seconds is markedly abnormal, and is nearly always symptomatic. If the VRT is less than 10 seconds, venous ulcerations are likely.

Duplex US with color-flow imaging (sometimes called triplex ultrasound): This is a special type of 2-dimensional ultrasound that uses Doppler-flow information to add color for blood flow in the image. Vessels in the blood are colored red for flow in one direction and blue for flow in the other, with a graduated color scale to reflect the speed of the flow. Venous valvular reflux is defined as regurgitant flow with Valsalva that lasts greater than 2 seconds.

INVESTIGATIONS:

- Haemogram
- Blood sugar
- Serum creatinine
- Bleeding time, clotting time and prothrombin time
- Xray chest
- ECG
- Doppler of lower limb venous system to rule out any DVT

RELEVANT ANATOMY

The greater saphenous vein (GSV) originates on the medial foot as part of the venous arch and receives tributaries from deep veins of the foot as it courses upward along the anterior aspect of the medial malleolus. From the ankle, the GSV continues along the anteromedial aspect of the calf to the knee and into the thigh, where it is found more medially. From the upper calf to the groin, the GSV is usually contained within an envelope of thin fascia. Visualization of this fascial envelope is an important way of identifying the GSV with duplex ultrasound. This fascial envelope often prevents the GSV from becoming significantly dilated, even when large volumes of reflux pass along its entire length. A normal GSV is typically 3-4 mm in diameter in the mid thigh.

Along its course, a variable number of named perforating veins may connect the GSV to the deep system at the femoral, posterior tibial, gastrocnemius, and soleal veins. The Cockett perforators, between the ankle and the knee, are a special group of perforating veins. Rather than directly connecting the superficial to deep venous systems, they connect the subfascial deep system with the posterior arch vein, which then empties into the GSV.

Besides perforating veins, the GSV has numerous superficial tributaries as it passes through the thigh. The most important of these are the posteromedial and anterolateral thigh veins, found at the level of the mid thigh, and the anterior and posterior accessory saphenous veins at the level of the canal of Hunter in the upper thigh, where a perforating vein often connects the GSV to the femoral vein. Just below the SFJ, the GSV receives several additional important tributary veins. These include the lateral and medial femoral cutaneous branches, the external circumflex iliac vein, the superficial epigastric vein, and the internal pudendal vein. These tributaries are frequently involved in the reflux that leads to the appearance of surface varicose veins on the lower thigh or upper calf.

The termination point of the GSV into the common femoral vein is called the saphenofemoral junction in the English literature but is known as the *crosse* (i.e., shepherd's crook) in the French medical literature. The terminal valve of the GSV is located within the junction itself. In most cases, at least one additional subterminal valve is present within the first few centimeters of the GSV. Most patients have a single subterminal valve that can be readily identified approximately 1 cm distal to the junctional valve.

Reflux at or near the SFJ does not always come through the terminal valve of the GSV, nor does it always involve the entire trunk of the GSV. Reflux can enter the GSV below the subterminal valve or even immediately below the junction, passing through a failed subterminal valve to mimic true SFJ incompetence. Reflux can also pass directly into any of the other veins that join the GSV at that level, or it may pass a few centimeters along the GSV and then abandon the GSV for another branch vessel.

When a perforating vein is the primary site of reflux, dilatation of the vessel proceeds both proximally and distally. When dilatation reaches the most proximal portion of the vein, the saphenofemoral or saphenopopliteal junction is often recruited as a secondary point of reflux. Although most large varices are tributaries off of an incompetent GSV or SSV, failed perforating veins or connecting veins can also give rise to independent varices in the greater saphenous distribution without involving the saphenous system itself. Identifying the originating point and the primary pathway of reflux in the thigh is often difficult, which is why duplex ultrasound has become so helpful in varicose vein workup.

OPERATIVE TECHNIQUES:

1. Safenofemoral ligation with long saphenous vein removal for long saphenous vein varicosities. Surgical removal of the GSV has evolved from large open incisions to less invasive stripping. Original methods of stripping used different devices and variations of techniques. The Mayo stripper was an extraluminal ring that cut the tributaries as it was passes along the vein. The Babcock device was an intraluminal stripper with an acorn-shaped head that pleated up the vein

as it pulled the vessel loose from its attachments. The Keller device was an internal wire used to pull the vein through itself, as is done today with perforation-invagination (PIN) strippers.

Currently, the technique of PIN stripping begins with a 2- to 3-cm incision made at the groin crease. The femoral vein and SFJ are exposed with dissection and all tributaries of the SFJ must be identified and flush-ligated to minimize the incidence of reflux recurrence.

After ligation and division of the junction, the stripping instrument (usually a stiff but flexible length of wire or plastic) is passed into the GSV at the groin and threaded through the incompetent vein distally to the level of the upper calf. The stripper is brought out through a small incision (5 mm or smaller) approximately 1 cm from the tibial tuberosity at the knee. An inverting head is attached to the stripper at the groin and is secured to the proximal end of the vein. The vessel is then inverted into itself, tearing away from each tributary and perforator as the stripper is pulled downward through the leg and out through the incision in the upper calf. If desired, a long epinephrine-soaked gauze or ligature may be secured to the stripper before invagination, allowing hemostatic packing to be pulled into place after stripping is complete.

An older technique of stripping to the ankle (rather than to just the knee) has fallen into disfavor because of a high incidence of complications, including damage to the saphenous nerve, which is closely associated with the vein below the knee

2. Subfacial ligation with below knee removal of long saphenous vein for below knee varicosities associated with incompetent perforators.
3. Removal of the short saphenous vein is complicated by variable local anatomy and risk of injury to the popliteal vein and peroneal nerve. The saphenopopliteal junction must be located by duplex examination before beginning the dissection, and adequate direct visualization of the junction is essential. After ligation and division of the junction, the stripping instrument (often a more rigid stripper that facilitates navigation) is passed downward into the distal calf, where it is brought out through a small incision (2-4 mm). The stripper is secured to the proximal end of the vein, which is invaginated into itself as it is pulled downward from knee to ankle and withdrawn from below.
4. Stab phlebectomy (or ambulatory phlebectomy)

Performed by Galen as early as the second century, this procedure came back into modern favor during the 1960s and has increased in popularity ever since. This procedure is extremely useful for the treatment of residual vein clusters after saphenectomy and for removal of nontruncal tributaries when the saphenous vein is competent. Ambulatory phlebectomy is a treatment for superficial varicose veins. The procedure involves the removal of the varicose veins through small 2–3 mm incisions in the skin overlying the veins. The procedure may be performed in hospital or outpatient settings. The procedure may be performed with tumescent local anesthesia, such as with lignocaine.

A microincision is made over the vessel using a tiny blade or a large needle, a phlebectomy hook is introduced into the microincision, and the vein is delivered through the incision. With traction, as long a segment as possible is pulled out of the body until the vein breaks or cannot be pulled any further. Another microincision is made and the process is begun again and repeated along the entire length of the vein to be extracted. Short segments of veins can be removed through tiny incisions without ligatures, and skin closure is not necessary.

NEWER METHODS

1. Endovenous laser
2. Radiofrequency ablation
3. Sclerotherapy
4. Cutaneous electrodesiccation
5. Subfascial endoscopic perforating vein surgery

POST SURGERY INSTRUCTIONS

After treatment of large varicose veins by any method, a 30- to 40-mm Hg gradient compression stocking is applied and patients are instructed to maintain or increase their normal activity levels. Most practitioners also recommend the use of gradient compression stockings even after treatment of spider veins and smaller tributary veins.

Activity is particularly important after treatment by any technique because all modalities of treatment for varicose disease have the potential to increase the risk of DVT. Activity is a strong protective factor against venous stasis. Activity is so important that most venous specialists will not treat a patient who is unable to remain active following treatment.

COMPLICATIONS

A correct diagnosis of superficial venous insufficiency is essential. Veins should be treated only if they are incompetent and if a normal collateral pathway exists. Removal of a saphenous vein with a competent termination will not aid in the management of nontruncal tributary varices.

In the setting of deep system obstruction, varicosities are hemodynamically helpful because they provide a bypass pathway for venous return. Hemodynamically helpful varices must not be removed or sclerosed. Ablation of these varicosities will cause rapid onset of pain and swelling of the extremity, eventually followed by the development of new varicose bypass pathways.

The most annoying minor complications of any venous surgery are dysesthesias from injury to the sural nerve or the saphenous nerve. Subcutaneous hematoma is a common complication, regardless of treatment technique used. It is easily managed with warm compress, NSAIDS, or aspiration if necessary.

WHO DOES WHAT?

Doctor:

- i) Surgeon: diagnosis & work up
Pre operative planning

Operative procedure

Post operative follow up

- j) Anesthetist: PAC, anesthesia

NURSE:

- Dressing of the wound
- Pre & post operative care

TECHNICIAN:

- Pre op equipment and drugs to be checked and kept ready
- Assist anesthetist in the OT
- Assist the surgeon, positioning of the patient

RESOURCES REQUIRED FOR ONE PATIENT / PROCEDURE (Patient weight 60 Kgs)

Human Resources	Investigations	Drugs/Consumables	Equipment
Surgeon – 1	Haemogram	Antibiotics	OT Table & lights
Medical Officer /	Blood Sugar	Analgesic	Instrument trolley
Assistant Surgeon – 1	S. Electrolytes	I.V. Fluids	General Surgery Set
Anesthetist – 1	S. Creatinine	Sutures	Cautery
Staff Nurse – 1	ECG	Drains	Suction
Technician – 1	X-Ray – Chest	Anesthetic drugs	Anesthetic Equipment

Nursing Orderly – 1	Doppler	Dressings	Monitors
Sweeper – 1			

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