Ano-Rectum

Rectum is the terminal part of embryological hind gut, and lies entirely in pelvis. It exits from pelvis into the perineum, through an opening in levator ani, a fan shaped muscle that forms the pelvic floor.

About 1-2 cms of hind gut which descends into the perineum is joined by another 1-2 cms tube, which starts as a dimple behind the embryological cloacae, and is called the proctodeum. These two tubes join together, septum in between them disappears, and a 3-5 cms long single tube, is formed, called Surgical anal canal. The junction where the septum was is called ‘Pectinate line’ or ‘Dentate line’ due to its serrated teeth like appearance. This is also called anatomical ano-rectal junction.

Things can go wrong in this complex embryological development, leading to congenital anomalies called ‘Ano-Rectal Malformations’.

These are classified according to the level of agenesis, Low if below the pelvic floor, and High if stops above the pelvic floor. High type may be associated with fistulae connecting the rectum with the genital/urinary tracts. If anal opening is absent at birth, it is called Anorectal Agenesis, popularly known as ‘Imperforate Anus’. An invertogram or lateral plain film with raised pelvis, 6-8 hours after birth, can help in diagnosing the level of agenesis. Treatment of ano-rectal agenesis is by surgical corrections. Child should be examined for other associated congenital anomalies.

Acquired lesions of ano-rectum are found in ‘Perineum’, a diamond shaped area bound anteriorly by pubic symphysis, posteriorly by tip of coccyx, and laterally by two ischial tuberosities.

Any lesion outside perineum is not likely to be connected with ano-rectum.

Knowledge of anatomy and physiology of ano-rectum is necessary to understand ano-rectal lesions, their diagnosis and management.

Dentate line, defining the junction of hind gut and the proctodium, is a watershed between visceral and somatic components of development.

Above the line, the canal is lined by columnar epithelium, surrounding muscle is circular smooth muscle forming internal sphincter, nerve supply is autonomic, blood supply is from above by superior rectal artery, venous drainage is in portal system, and lymphatic drainage is upwards in rectal and para-aortic lymph nodes.

Below the dentate line, the canal is lined by squamous epithelium or skin, which is surrounded by the condensed part of skeletal muscle levator ani which forms the external sphincter, supplied by somatic nerves, blood supply comes from internal pudendal artery, venous drainage is outwards in systemic circulation, and lymphatics drain in inguinal lymph nodes.

Voluntary [external] and involuntary [internal] sphincters control the anal canal.

When they are in normal contracted state, they make the dentate line as the narrowest part of anal canal. This creates folds in mucus membrane above which are called the columns of Morgagni. Lower end of these folds join horizontally to form anal valves. Upturn ends of columns form crypts and papillae. Skin below the line is thin, smooth and non hairy till the anal verge. A subcutaneous muscle, 'Muscularis Cutis Ani' surrounds the anal verge, throwing skin into wrinkles. This area is so sensitive that even a soft touch throws this muscle in contraction closing the anal opening, a necessary defense mechanism.

The dentate line is the end of visceral portal circulation; hence a spongy

vascular plexus is formed by capillaries which surround the anal canal just above the dentate line. This is called internal haemorrhoidal plexus, and is lined by mucous membrane. Upper anal canal thus takes the shape of a funnel. Similarly capillaries at the anal verge form the external haemorrhoidal plexus, covered by skin.

Ten to twelve mucous anal glands are placed between the internal and external sphincters at the level of dentate line. Their ducts open in the crypts releasing mucous. This mucous is required to lubricate faeces.

Outside the sphincters, there is space filled with loose fibro-fatty tissue, called the ischeo-rectal fossa. This space is required to accommodate rectal distension while storing faeces.

The sphincter complex consists of the internal sphincter which is continuation of circular smooth muscle of the rectum. These muscle fibers cover lower rectum and anal canal like a spiraling spring. At lower end, fibers become compact to form the circular internal sphincter. Dividing the lowermost fibers of this circular spring like muscle, as in internal sphincterotomy, does not cause incontinence, since rest of muscle is intact to control the anal canal. Longitudinal muscle of the rectum becomes fibrous at the lower end. These fibers pass between the internal and external sphincter, fan out at the anal verge and get attached to the skin. This creates small subcutaneous compartments at the anal verge. Any collection here, blood or pus, howsoever small, causes severe throbbing pain.

Lowermost fibers of skeletal muscle, levator ani, are condensed into three groups around anal canal to form the voluntary external sphincter. They are the deep, superficial and subcuteneous external sphincters. Their function is to voluntarily control defaecation. During sleep or unconscious states, involuntary

sphincters take over, preventing incontinence.

For absolute security, another control mechanism is added by the Anorectal sling mechanism. Few fibers of pubo-rectalis muscle circle around the lower rectum, forming a sling. When contracted, it pulls the rectum forwards, thus angulating it and obstructing the passage of rectal contents. It relaxes when it is convenient to defaecate. In dire emergency, this mechanism comes into action to hold flatus and faeces.

Physiological function of ano-rectum is to control and facilitate the defaecation process. Requirements for normal defaecation are, increase in intra-rectal pressure, and coordinated relaxation of sphincters. Normal resting rectal pressure, a function of internal sphincter; and the squeeze rectal pressure, a function of external sphincter, varies from 0-60 cms of water, as shown by rectal manometery. When rectal pressure rises to more than 60 cms of water, defaecation reflex sets in. When it reaches twice the maximum normal pressure, it becomes difficult to hold the contents.

Receptors in the rectal ampulla are capable of distinguishing between faeces and flatus; thus allowing their passage at will. Flatus can be passed anytime anywhere but faeces must be held till the person is appropriately seated for the purpose.

As soon as defaecation reflex sets in, sphincters come into action. Both sphincters relax if conditions to defaecate are convenient; otherwise voluntary control can hold the process till convenience is available.

It is obvious how intricately and sophisticatedly the defaecation function is controlled by the brain in human body, a very important distinction between humans and animals.

Incontinence results when these mechanisms are not yet well developed as in infants, when they are weak as in old age, damaged or destroyed due to perineal trauma or operations, or nonfunctioning as in spinal injuries.

Normal defaecation means easy passage of faeces, which slide along the walls of ano-rectal funnel, lubricated by the mucous, supported by haemorrhoidal cushions below, till they exit safely through adequate opening provided by controlled relaxation of the sphincters.

Most of the ano-rectal problems are due to the malfunctioning of this complex mechanism of defaecation; straining to pass stool, thus raising the intra-rectal pressure, and in-coordination between squeeze and relaxation of sphincters.

Anal Fissure

Too much pressure by straining against partially opened sphincters leads to tears in the skin below the dentate line. These tears are called ‘acute anal fissures’.

Muscle fibers of levator ani, which form ano-rectal sling curve around the lower rectum and do not reach the coccyx. A triangular gap is thus produced posteriorly, where mucosal lining becomes unsupported. It is here that lining membrane bears the full brunt of defaecation pressure and breaks down as fissures. Posterior Anal Fissures therefore are the commonest. When fissures are situated anteriorly or laterally, other pathological causes must always be considered such as trauma, abuse, venereal diseases, etc. Such fissures may be chronic and recurrent.

Acute anal fissures are extremely painful, and blood oozing from cuts streaks the faeces on its sides. Sphincters go further into spasm due to pain and a

vicious circle sets in, causing straining, fissures, pain, more straining and so on. Diagnosis is by inspection only. Since sphincters remain in spasm, it requires efforts to separate the anal margins, revealing the fissure. An oedematous swollen skin tag at the lower end of fissure, called ‘Sentinel pile’, is a guide to a hidden anal fissure.

Treatment is by reducing defaecation pressure and relieving the pain. Bulk laxatives help. Anaesthetic ointment, locally applied as cream or jelly numbs the nerve endings, reducing the pain and helps sphincters to relax. Hot bath [Sitz bath] serves the same purpose by cleaning the tears, and relaxing the sphincters. Anal fissure is a self limiting disease; cuts are superficial and heal in time. If straining persists, it becomes a recurrent disease. In such cases stretching the internal anal sphincter [anal dilatation] or dividing its lowermost fibers by internal sphincterotomy helps in healing. Same results are achieved by chemical sphincterotomy using nitroglycerine ointment or botox injections. Neglected or long standing fissures become chronic with thick fibrotic edges which prevent healing. Such cases require excision of fissures [fissurectomy].

Internal Haemorrhoids

The term ‘haemorrhoid’ is derived from two words,‘haem’and ‘rrhage’ meaning blood, that flows.

Haemorrhids are soft vascular cushions from which red fluid blood flows. Since they arise above the dentate line, they are called internal haemorrhoids. These cushions develop at the terminal end of the three branches of superior rectal artery, one on the left and two on right. These are three classical primary haemorrhoids at 3, 7, 11, o’clock positions when seen in lithotomy position.

Too much straining during defaecation exerts pressure on haemorrhoidal cushions too, squeezing them to the point of bursting through the thin mucous

membrane. This results in painless bleeding, fresh red blood falling drop by drop at the end of defaecation. These are First degree haemorrhoids.

As pressure remains repeatedly high, not only faeces, but the haemorrhoidal cushions are also pushed through the anal opening. They develop a pedicle and descend below the dentate line. They return back once pressure is released or can be pushed back easily, manually. These are Second degree haemorrhoids.

A stage comes when they no longer can be reduced and remain out below the dentate line, known as Third degree haemorrhoids. Since sphincter is relaxed, they are painless. Their lower part is covered by skin; hence they do not bleed easily. They may join the external haemorrhoidal plexus, then they are called ‘Intero-external haemorrhoids. They are wrongly named as prolapsed haemorrhoids which are an acute and painful condition.

Painless bleeding, in drops, at the end of defaecation is the only symptom of internal haemorrhoids. Episodes of bleeding are self limiting, stop by themselves after some time, but may recur again and again. Nodular swellings around the anus may be felt while cleaning after defaecation. They are either prominent external haemorrhoidal cushions or skin tags. Similarly, anal papillae may get hypertrophied and can become palpable when they are downturned due to pressure at defaecation. These are usually mistaken by patient as haemorrhoids. All these are painless and require no treatment.

Remember, swellings that do not bleed are not haemorrhoids.

Internal haemorrhoids, being soft, cannot be felt on per rectal exam by examining finger. They are diagnosed on proctoscopy.

First degree haemorrhoids need nothing more than high fiber diet and mild bulk laxatives to keep the stools soft. During bleeding episodes, haemorrhoidal

ointments can decongest the cushions and stop bleeding.

Second degree haemorrhoids have developed a neck, which allows them to move in and out. They can therefore be banded at the neck by rubber bands, or can be shrunk by the injection of sclerosing agents in the neck. Both procedures are performed through proctoscope. Since the neck is above the dentate line and covered by mucosa, both procedures are painless. If by mistake skin below dentate line is included, severe pain ensues and a general anaesthesia may be required to remove the band. More than one session may be required; till they shrink and bleeding stops.

Third degree haemorrhoids may occasionally bleed from their mucosal component. Being covered partly by skin, they can neither be banded nor injected without causing severe pain. The treatment therefore is haemorrhoidectomy.

Second degree haemorrhoids, which move in and out with defaecation, may suddenly be caught, while they are out, by severe spasm of the sphincters, strangulating their neck, and preventing them from returning back, something like irreducible hernia. These are called ‘Prolapsed haemorrhoids’.

This does not happen with first degree haemorrhoids since they have no neck, or with third degree, since they are already out and remain so.

Prolapsed haemorrhoids swell in size due to oedema, and undergo strangulation, thrombosis, and ulceration. The condition is acute, severely painful and requires emergency management; unlike third degree haemorrhoids. Treatment includes reducing the oedema by pelvic elevation and cold compresses, so that they may reduce spontaneously. In severe cases, reduction under anaesthesia is required. Haemorrhoidectomy, in this oedematous stage, is avoided, and postponed till a later date.

Secondary haemorrhoids are due to rectal carcinoma blocking the venous flow. In haemorrhoids of recent onset in elderly, sigmoidoscopy is a must, before dealing with haemorrhoids.

Advanced portal hypertension is also implicated for causing secondary haemorrhoids; also called varices at the portocaval junction at dentate line. Evidence however is not very supportive.

Haemorrhoidal cushions are spongy mass of AV capillaries. Bleeding is 'Red and fresh', because arterial pressure is higher than venous pressure.

There is nothing like 'Arterial piles'; it is a misnomer.

Important Facts and Observations about Internal Haemorrhoids

Unusual before age 20, Not Familial.

More often asymptomatic, Symptomatic Prevalence not more than 5.0%.

Haemorrhoids are NOT rectal varices, They RARELY cause anaemia.

Internal haemorrhoids are not palpable, Diagnosis requires proctoscopy.

Haemorrhoids is a 'Local' disease and requires local treatment.

Systemic medications are not essential; they act as placebo only.

Asymptomatic haemorrhoids require NO treatment.

'Sudden onset' of symptoms [An attack of piles] requires conservative management only.

'Occasional'symptoms need diet control, and local applications only.

'Recurrent' symptoms need interventional treatment.

4th degree haemorrhoids may be associated with soilage and partial incontinence.

Peri-Anal Haematoma [External Haemorrhoid is Wrong Term]

Bleeding due to straining may occur in the external haemorrhoidal plexus also. Since skin remains intact, blood does not come out. Instead, the blood clots, and the tension in septated closed spaces at anal verge cause severe pain. The condition is wrongly called thrombosed external pile; although it is not pile. 'Peri-anal haematoma' is the correct term. Diagnosis is easy; a bluish, tense and tender swelling at the anal verge is revealed on inspection. Excision under anaesthesia is the treatment of choice.

It is important NOT to confuse between the terms internal and external haemorrhoids. Their pathophysiology is totally different.

Early Intenal Haemorrhoids vs External Haemorrhoids

Early Internal Haemorrhoid [Real]	External haemorrhoid [Perianal Haematoma]
Bleed	Do not bleed
Not visible	Visible
Painless	Very painful
Prolapse	Do not prolapse
Not palpable	Palpably tender
Need proctoscopy	Proctoscopy not needed
Require intervention	No intervention
Operation not required	Require operation
Oral medication useful	Oral medication useless

Ano-Rectal Sepsis

Ano-rectal sepsis begins in anal glands. Squeezing pressure on anal glands

due to contracting sphincters is normally higher than intra-rectal pressure; mucous therefore flows from glands to the anal canal. When intra-rectal pressure becomes higher due to straining at defaecation, flow may become reversed, allowing bacteria from anal canal to enter the mucous filled glands and facilitate their multiplication. This is the genesis of 'Peri-anal abscesses'. Rarely an acutely infected anal fissure or perineal injuries are exogenous causes for such abscesses.

They begin in inter-sphincteric space; and as they enlarge, may track downwards to present at anal verge as peri-anal abscess, track laterally and present as ischeo-rectal abscess, enlarge medially as sub-mucous abscess, or track upwards through the muscle to form supra-levator abscess.

Presenting symptoms are swelling, throbbing pain and fever.

Examination of perineum reveals tender, hot swelling in peri-anal region. Digital rectal examination is painful and should be avoided, unless abscess is deep like supra-levator. In such cases examination under anaesthesia is advised.

Treatment is by incision and drainage. Small incisions may close prematurely, causing recurrence of abscess or persistent opening, called fistula. A cruciate incision with trimming of the edges provides wide opening for drainage and avoids fistula formation. Sub-mucous abscess can be drained intra-rectally.

Ischeo-rectal abscesses are loculated. All septi should be broken by finger while draining under anaesthesia, so that recurrence does not happen.

Supra-levator abscess may be secondary to inflammatory bowel disease, and patients should be investigated accordingly.

Fistula-in-ano

Peri-anal fistulae are invariably secondary; to peri-anal abscess which has burst on the surface or has been inadequately drained. They may be associated with inflammatory bowel diseases such as tuberculosis, Crohn's disease or ulcerative colitis. Mucoid carcinoma of rectum can also present as multiple fistulae.

Anal fistulae are named according to the original site of the abscess; peri-anal, sub-mucous, inter-sphincteric, trans-sphincteric, or supra-levator. Internal opening in all fistulae arising in anal glands is in the crypts at dentate line while external opening is in the perineum.

Supra-levator fistulae are called 'High fistulae', since they pass through the levator ani muscle. All other are called 'Low fistulae'. This is important in the management, since surgical approach to high fistulae may damage sphincters and the fibers of levator ani which forms ano-rectal sling. This may lead to incontinence of faeces or flatus.

High fistulae must be suspected if symptoms of inflammatory bowel disease IBD are present, if there are multiple external openings which are situated more than 1 cm. away from anal verge, and if fistulae recur. In horseshoe fistula, internal opening is invariably in posterior midline, while external openings are laterally situated. The Goodsall's rule is used to dictate that if the external opening of anal fistula is situated posterior to an imaginary transverse line across anal canal, such fistulae have curved track. Internal opening is nearly always in the posterior midline. If fistula opening is anterior to such line they are likely to have straight track.

MRI is useful in locating the fistula tract, and is replacing the traditional fistulogram. Sigmoidoscopy and colonoscopy must be done when IBD is

suspected. Endorectal ultrasonography helps in demonstrating the changes in rectal wall and in para-rectal area. This can also be performed during operation.

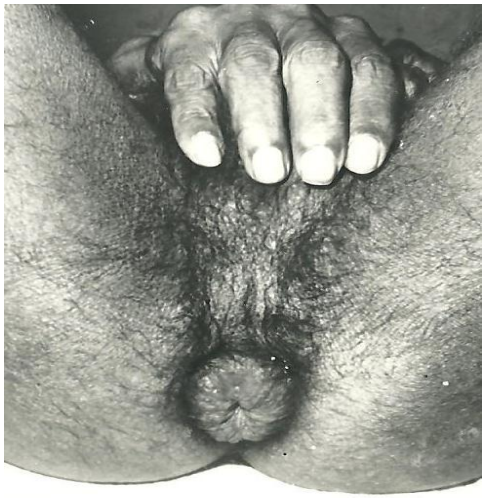
Low fistulae can be laid open without sphincter damage, allowing them to heal by secondary intension. High fistulae and trans-sphincteric fiatulae require different approach. After laying open the lower portion, inner opening can be identified by injecting methylene blue solution. A Seton may then be used across the muscle fibers, which provides continuous drainage, does not let the wound heal prematurely, and eventually cuts through the muscle. By this time healing is complete. However seton should not be used if active inflammation is present, since it will act as a foreign body perpetuating infection, and will delay healing.

In expert hands, fistulectomy, [coring out the fistula], after delineating the track by injecting methylene blue], is a safe procedure. Newer techniques like the use of glue are still in experimental stage. Recurrences are quite common in ano-rectal fistulae.

Rectal Prolapse

Rectal prolapse is the result of weak pelvic floor muscles and increased intra-rectal pressure. It may be only mucosal [partial] prolapse, as happens in infants whose muscles are still developing; or it may be complete rectal prolapse when whole rectal wall comes out of anal opening. This happens in elderly with weak and degenerating muscles.

Complete rectal prolapse may be associated with rectal carcinoma, which must be excluded before treating the prolapse.



Mucosal rectal prolapse

Complete rectal prolapse

Partial prolapse in children may resolve as infant grows. Sub-mucous injection of sclerosing agent may be sufficient to prevent mucosal prolapse. Complete prolapse must first be reduced, and then retained by a special stitch, called Thiersch's stitch around the anal opening, leaving enough opening for the purpose of defaecation.

Special operations are required for definitive treatment of complete rectal prolapse. After mobilizing the rectum, it can be fixed in sacral hollow by a mesh [Charles Wells' operation]. Abdominal approach is preferred to perineal approach. In other operations muscles of pelvic floor are repaired and strengthened [Roscoe Graham's operation and its modification by Goleghar]. Extra-peritoneal colopexy [Lahaut's operation] is other option.

It is important to differentiate between Fourth degree Haemorrhoids, Prolapsed Haemorrhoids and Rectal prolapse. These three are totally different entities with totally different pathophysiology.

4th degree piles	**Rectal prolapse**
Middle age	Young and old
Always out	In and out
Not reducible	Reducible
Covered by skin	Covered by mucosa
Rarely bleed	Do bleed
Painless	Painless
Require surgery	Require replacement

4th degree pile	**Prolapsed piles**
Painless	Severe pain
Relaxed sphincter	Sphincter in spasm
Rarely bleed	Do bleed
Need no reduction	Need reduction
Operation required	Operation avoided

Inflammations

Proctitis usually is associated with ulcerative colitis. Other causes are radiation proctitis and bilharzial proctitis.

Solitary rectal ulcer is an entity of unknown etiology. Symptoms are tenesmus, burning pain, and bloody mucous discharge. These lesions may be associated with pseudopolyps, which resemble true polyps, and can only be differentiated by histology.

Pruritis ani is due to poor hygiene, nappy rash or fungal infections.

Non Specific Peri-Anal Swellings

Infective warts and granulomas like condylomas, can be of viral or venereal origin. They cause discharge and also pruritis. HIV must be kept in mind.

Skin tags are due to resolved peri-anal haematoms or shrunk fibrotic sentinel piles. They are commonly mistaken by the patient for haemorrhoids. These are harmless and need no treatment other than reassurance.

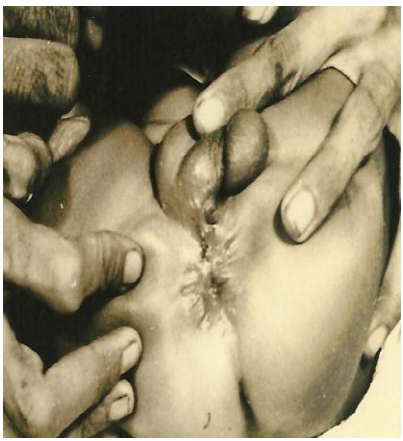
Hypertrophic anal papillae, although lie above dentate line, may descend and evert during downward pressure of defaecation, and can be felt while cleaning.

Similarly, fibrosis of long standing intero-external haemorrhoids persist as firm peri-anal swelling.

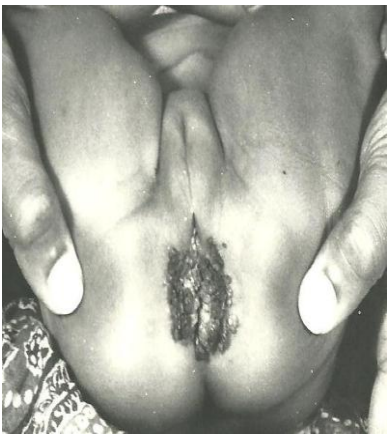
All these non-specific swellings are harmless but cause unnecessary concern for the patient.

Anal stenosis may be congenital; but anal strictures are invariably due to chronic inflammatory bowel diseases. They may be postoperative or follow perineal trauma and burns. Badly performed haemorrhoidectomy is the most common cause of acquired anal stenosis.

Treatment is by the graduated use of anal dilators. Posterior anoplasty may be required in severe cases.



Anal stenosis



Anal warts

Anal incontinence is also the result of trauma or poorly performed operations. It may be partial, for flatus only, or complete inability to hold faeces and flatus. Anal manometery is required to assess the tone of sphincter complex. In major cases surgery for sphincter reconstruction may be required.

Ano-Rectal Tumors

Benign tumors are called polyps. In children these are juvenile polyps. Those with long pedicle can prolapse through anus and can be snared.

In adults polyps are benign adenomas, tubular or villous; pedunculated or sessile. They are considered premalignant lesions; specially villous and sessile ones. Painless bleeding per rectum is the common mode of presentation. They are diagnosed by endoscopy and biopsy. Small sessile tumors can be electro-fulgarated; pedunculated ones can be snared through endoscope or excised operatively.

Rectal polyps may be a part of colonic polyposis; familial adenomatous polyposis [FAP], or hereditary non-polyposis colorectal cancer [HNPCC or Lynch syndrome]. Colonoscopy and biopsy is a must. Treatment options vary, from local excisions to total proctocolectomy.

Colo-rectal carcinoma is the commonest tumor of GIT, and the recto-sigmoid is the commonest site. Exact etiology is not known, but genes are widely implicated. Microscopically most ano-rectal tumors are adenocarcinoma. Squamous cell carcinoma occurs at the lower part of anal canal and presents as painless masses and bleeding ulcers. Melanoma, lymphoma and sarcomas are rare tumors.

Primary spread of rectal cancer is by direct infiltration of the rectal wall and the para-rectal tissues. Lymphatic spread is to the para-rectal lymph nodes and

finally to central para-aortic lymph nodes. Blood spread is to the liver via portal circulation.

Rectal tumors are staged by Dukes' method. Duke stage 'A' is tumor is confined to mucosa only. Duke stage 'B' involves rectal wall and extra-rectal tissue but not lymph nodes. Duke stage 'C' is when tumor involves para-rectal lymph nodes. Duke stage 'D' is distant metastases in liver.

Imaging by endo-rectal US and CT scan of abdomen and pelvis are very useful in staging the tumor, which directs the treatment and the prognosis.

Tumor markers like CEA also have diagnostic and prognostic significance.

Clinical presentation is by increasing constipation, altered bowel habits, tenesmus and sense of incomplete evacuation, bleeding per rectum or abdominal mass. Late presentations are due to severe haemorrhage, intestinal obstruction, or rectal prolapsed. Diagnosis is confirmed by endoscopy and biopsy. CT scan and endo-ultrasonography helps in staging the tumor.

Radical surgery is the best option for cure in early stages. Procedures may vary. Wide resection, keeping a clear margin of at least 5 cms. on either side of the palpable mass is advised for rectal tumors. Anterior resection for upper third rectal tumors, and low anterior resection for middle third rectal tumors is required. Abdomino-perineal resection with terminal end sigmoid colostomy is reserved for cancers of lower third of rectum. Total meso-rectal excision [TMRE] gives better chance of cure.

In advanced tumors, pre-operative chemo-radiation may shrink the tumor to make it resectable. Adjuvant chemotherapy, after surgery, may prevent recurrence. Emergency surgery for recto-sigmoid tumors with obstruction may end in Hartman's procedure, with temporary colostomy. Continuity of bowel

can be restored later.

Anal cancer is squamous cell type. It metasizes in the inguinal lymph nodes. Radical excision with block dissection of involved lymph nodes is the treatment of choice. Fortunately it is rare and being radiosensitive, radiotherapy is an option. Melanomas are known to occur at muco-cutaneous junction of anal canal. Their presentation, spread and treatment is like squamous cell cancers.

Diagnosis of Ano-Rectal Problems

Ano-rectal symptoms and their combination are very suggestive of diagnosis.

Main symptoms are peri-anal swelling, bleeding per rectum (PR), and discharge.

Painless bleeding suggests internal haemorrhoids or polyps.

Painful bleeding usually is due to acute anal fissure.

Painful swelling without bleeding is peri-anal haematoma.

Painful swelling without bleeding but with fever is ano-rectal abscess.

Painful swelling with bleeding is prolapsed thrombosed internal haemorrhoid.

Painless swelling without bleeding is skin tag. Painless swelling with bleeding is serious like tumors; polyp or cancer.

Discharging opening, soiling the under clothes, is fistula-in-ano.

Ano-rectal examination is usually performed in left lateral position with legs and knees fully flexed, exposing the perineum. In the operating room (OR), lithotomy position is preferred. Examination starts with inspection. Skin around anus is noted for any signs of inflammation, swellings, scratch marks, discharging opening, blood or sogginess. Keeping a safe distance the patient is

asked to strain. Anything prolapsing is noted.

Fortunately all four painful conditions can be diagnosed by inspection only. They are acute anal fissure, peri-anal haematoma, peri-anal abscess and prolapsed thrombosed haemorrhoids.

Digital rectal examination [PR] or proctoscpy is not required in acute stage of these conditions, and must be deferred till pain subsides.

Per rectal examination is performed, after due consent, if painful conditions are not present. A gloved lubricated index finger is gently inserted and is directed upwards and anteriorly, towards the umbilicus. Tone of the sphincter is noted. Any mass, ulcer or extra-rectal swelling bulging into the lumen is recorded. Internal haemorrhoids, being soft cushions, cannot be diagnosed by PR.

While finger is inside, bimanual examination with one hand on supra-pubic area can reveal any pelvic mass if present. After removing the finger, any blood or mucous on it is noted.

Proctoscopy is next and follows the same routine. A lubricated instrument is inserted, obturator is withdrawn, and interior is inspected with light source. Any abnormal finding is recorded. While withdrawing the instrument, internal haemorrhoids, if present, come into view as three red cherry like swellings at usual 3, 7, and 11 o'clock positions. Procedure can be used for banding of haemorrhoids or injecting sclerosing agents, when indicated. If any suspicious lesion like swelling or ulcer, other than piles or hypertrophic anal papillae, is seen, a biopsy should be taken. In case blood is seen coming in the lumen from above, further examination by a sigmoidoscope and/or colonoscope will be required.

Ano-Rectal Mystery

Perineum holds the distinction of 'The mysterious area' because of the fear of unknown as well as for being the area chosen for sexual privileges.

Symptoms like pain, bleeding or swelling in the area of perineum cause terrible concern and psychological worry, simply because the patients cannot see for themselves, the problem, its magnitude or its source.

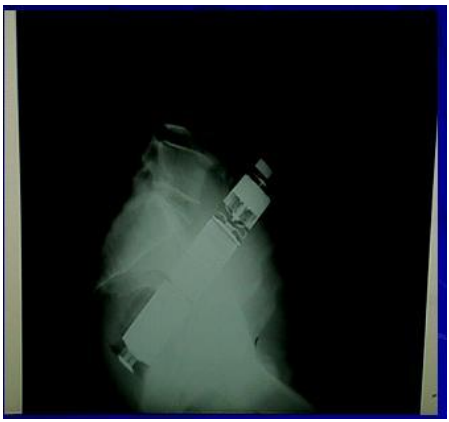
Moreover any problem in this area is immediately attributed as being the cause of sexual inadequacies which are quite common in everyday life of adult males and females. This makes patients feel shy towards openly discussing their problems in this area. This further adds to the mystery and the patient's misery.

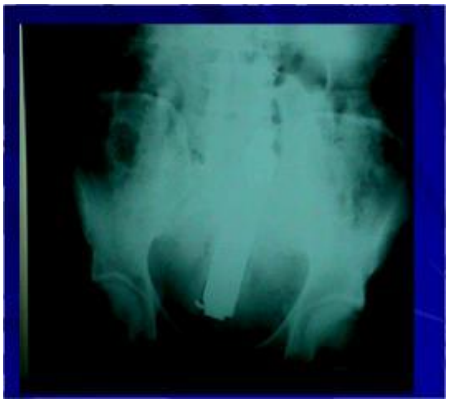
It is obvious that psycho-somatic manifestations of problems in this mysterious area should not be underestimated.

Foreign bodies, of all types have been reported in the rectum. They are the results of sexual perversions. X-rays of Two of my cases are illustrated here.

History was suggestive. Extraction under anaesthesia was required.

Counseling and psychotherapy is important part of management.





Reminder

1. Most of the ano-rectal problems are the result of 'irregular diet, unhealthy habits and poor hygiene'. In colorectal tumors too, diet has been implicated. Balanced diet with plenty of fiber and fluid, regular bowel habits, and good hygiene can reduce the risk factors for common ano-rectal problems.

2. Ano-rectal problems are not fatal, except for cancers.

3. However they can have tremendous psychological impact because of the fear of unknown as well as that of unseen.

   If one sees blood on the towel wiping the face, one immediately rushes to the mirror to see where it is coming from. When one sees blood on the cleaning tissue paper after defecation, there is no way to know where it is coming from, although some patients go to the extreme to visualize the source by strategically placing mirrors. For those who use western toilets, a single drop of blood makes all the water in the toilet bowl red, giving the impression to the patient that so much blood has been passed. It is easy to understand what it can do to the psychology of the patient. Added to this is the fact that there is natural reluctance of patients to consult, or even talk about the problem in the perineum because of natural shyness.

4. Problems down below such as pain and occasional bleeding are usually blamed by the patients for something totally unrelated due to mere ignorance. I have seen many patients in my clinic who thought that their generalized weakness, low back pain, even impotence and infertility, is due to their problems down below. It takes lot of efforts to convince them that the two are not related and both need separate evaluation and assessment.

5. Finally, ano-rectal problems, although they are 'The Tale of the Tail-End';

should not be ignored as minor, for they may have major impact on the personality of the patient as a whole. It should not be handled by persons who do not have detailed knowledge of the problems in this area; and the experience to deal with them. Improper handling and damage to the tissues causing strictures or incontinence may end in lifelong disaster for the patient.

Imagine the social and personal life of a patient who has even minor inability to control the flatus as a result of damage to the sphincter complex by wrong manipulations and mishandling of tissues during surgery!

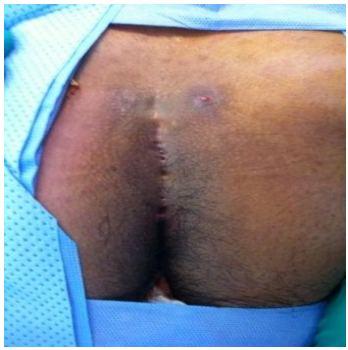
Pilonidal Sinus [PNS]

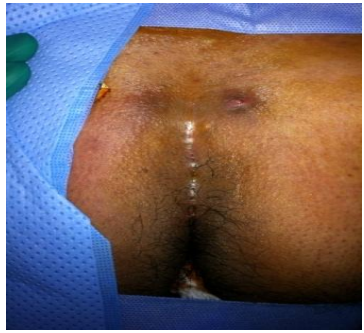
PNS most commonly occurs in natal cleft in sacral region, far away from perineum and is not a part of ano-rectal problems. Although congenital pits in natal cleft are present in a large number of normal populations, these may be the starter point for PNS in hairy individuals. The condition is now definitely considered as an acquired one, and is far more common in hairy males. Still it is not clear why it occurs in young females with no hair in the area! In hot weather, loose broken hair may penetrate the moist soggy skin of pits of sweating individuals and form nests under the skin, which act as foreign bodies and invite infection. Friction and suction effect as may happen while riding on hard seats as in jeep cars for example and promote the condition. Therefore the condition is sometime called ‘Jeep disease’.

The name itself explains the findings; pilus means hair, nidus means nucleus and sinus means persisting discharging opening. Infection may present as pilonidal abscess which requires incision and drainage. Persistent infected sinuses require surgical excision, with either primary closure, or may be left open to heal by secondary intention. Recurrences are very common; and hence

many operative techniques are described to prevent recurrence. Keeping the area clean, dry and regularly shaved may be preventive.

Umbilicus and the webs between fingers of hands in barbers are other rare sites for pilonidal sinuses. Conservative approach as office procedure by picking the loose hair out, shaving and cleaning the area and keeping it dry may succeed in some cases. Following pictures show pits in natal cleft with hair and the PNS.





The Hernia

The term ‘Hernia’ means protrusion of tissue/organ through a hole or defect. Herniation of brain through foramen magnum, herniation of muscle through a defect in fascia, and herniation of testis through a defect in tunica albugenia are rare examples where the term hernia is used.

However in practical sense of the term, most hernias occur in abdomen. Therefore hernia is defined as ‘Protrusion of abdominal viscera through an opening, defect or weakness in abdominal wall’.

There are natural openings in the abdominal walls to allow passage of tubes in and out of abdomen. They are inguinal rings [for spermatic cord/round ligament], and umbilicus [for umbilical cord] in anterior abdominal wall.

Superiorly there is a hiatus in diaphragm for the passage of oesophagus which requires extra space to expand. Inferiorly there is extra space for expansion of femoral vein as it enters the abdomen below inguinal ligament. This space is called femoral canal.

These are the common sites for abdominal hernia; Inguinal hernia, Umbilical and Paraumblical hernia, Femoral hernia and Hiatus hernia.

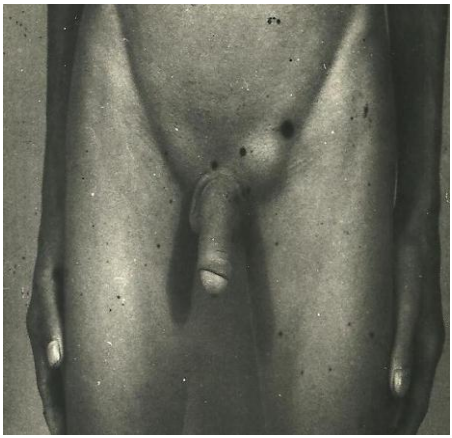
Umblical hernias are eversion of the umbilical scar and occur in infants and children. In the new born, they may not need any treatment since they may disappear with time.

Paraumblical hernia occurs in adults. Protrusion is by the side of the umbilical scar. Increased intra abdominal pressure and obesity are precipitating factors. Symptomatic hernias require surgical repair.

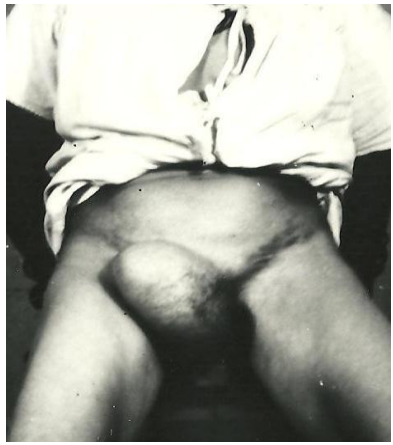
Congenital weakness of lateral abdominal muscles may result in very rare ‘Lumbar hernia’.

Extremely rare hernias are obturator hernia through obturator openings, lumbar hernia in lumber triangle [Petit’s triangle], and spegalion hernia in posterior rectus sheath.

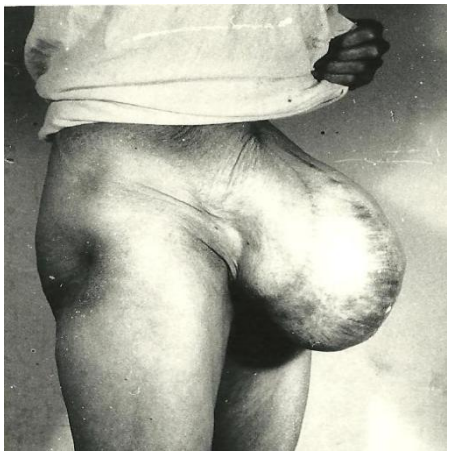
Acquired defects/weaknesses occur in scars after operations [incisional hernias]. In old age muscles of the lower abdomen are the weakest and the impact of straining is maximum; resulting in direct inguinal hernias.

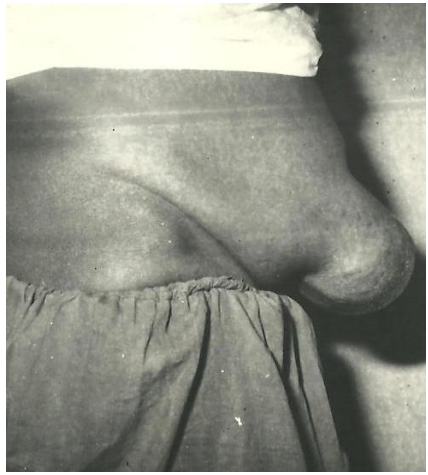


Left inguinal hernia in male

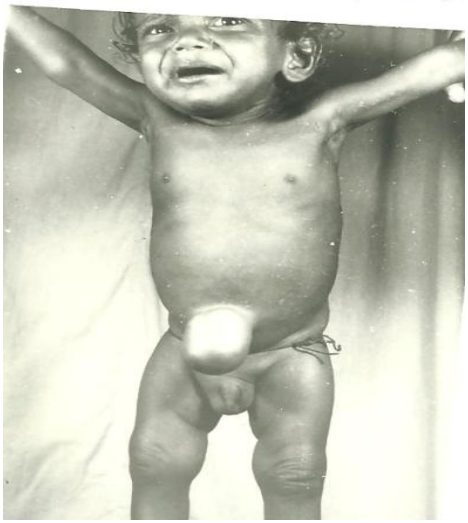


Large inguinal hernia in female

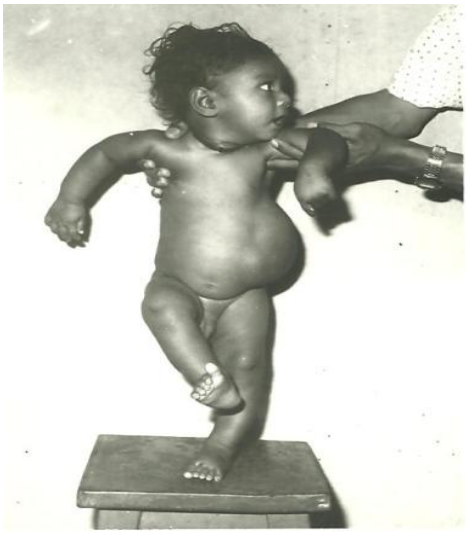




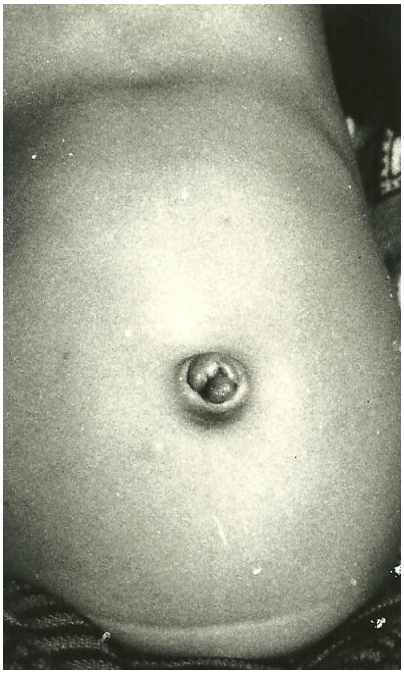
Large incisional hernias

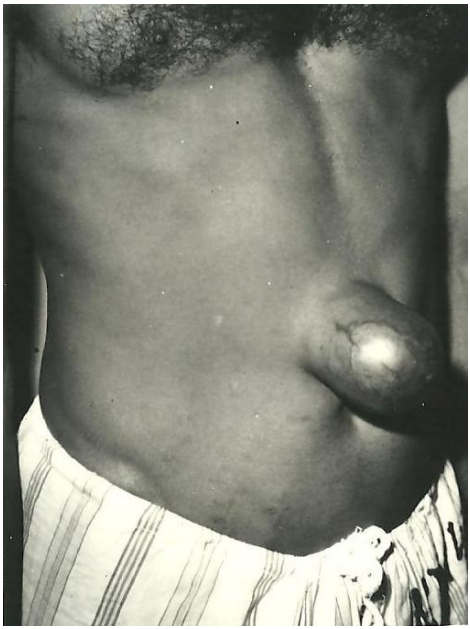


Umblical hernia [Common]



Lumbar hernia [Rare]





Para umblical hernia in adult

In order for hernia to occur, two things are required. One is increased intra abdominal pressure. This happens while coughing and sneezing or due to straining during micturition and defecation. The other is an opening, defect or weakness in abdominal wall. These two also defines the treatment, which includes removing the straining factors, closing the defects and strengthening the area.

Normally a hernia has three parts; a peritoneal sac of varying size and shapes, the coverings over the sac, usually the layers of abdominal wall; and the contents of the sac, which usually are the most mobile structures in the abdomen and which can protrude in the sac, such as intestines and omentum. [Enterocele or Omentocele].

Hernial sac has three parts; neck, body and fundus. It is the narrow neck which first obstructs the lumen of the bowel; and later the vessels in mesentery, causing strangulation of bowel.

Operations therefore deal with hernia in three steps. [The Three 'R'] Reduce the contents, Remove the sac, and Repair the defect. These procedures, performed by laparoscopy or open technique, provide the best treatment for hernias.

Tension free repair is the underlying principle for all hernia operations.

Different terms are used to denote these three steps. Herniotomy in infants and children is to reduce and remove only. There is no defect to repair. Herniorrhaphy in adults requires all three steps; i.e. reduce, remove, repair. Hernioplasty is use of extra material like mesh to plug the holes, cover the large defects or to strengthen the weakness as in old age.

Hernias are named by their site, and are diagnosed by the signs of impulse on

coughing or straining, and reducibility.

Elective operative treatment is advised for hernias to avoid complications which can be serious. Tension free repair prevents postoperative recurrences.

Irreducibility and incarceration are not serious by themselves, but can lead to other two serious complications, Intestinal obstruction and Strangulation; both requiring emergency surgery.

Irreducibility can be due to large volume of contents which have passed through a narrow opening and cannot return back; or due to Incarceration which means adhesions of contents with the sac, or to inspissations of contents in the bowel making it stiff and non-reducible.

While irreducibility is a clinical diagnosis, incarceration is an operative diagnosis.

Closed loop intestinal obstruction occurs when lumen of the bowel is pressed by the narrow neck of the sac.

Hernias are usually painless. Severe pain in suddenly irreducible hernia suggests Strangulation. Such hernias have no cough impulse and are very tender. Systemic response such as fever, tachycardia and leucocytosis supports strangulation. Emergency surgery is mandatory.

According to frequency, inguinal hernias are the commonest in both sexes, but more common in males than females.

Umblical and paraumblical hernias come next, closely followed by incisional hernias.

Femoral hernias are rare; however they occur more commonly in females than males, probably due to their wider pelvis and hence wider femoral canal.

These hernias are more prone to strangulation due to an extremely narrow ring.

Hernias in inguinal region can protrude along the spermatic cord through the inguinal canal [Indirect inguinal hernia]; or can protrude through weak wall medially [Direct inguinal hernia]. This weak area is called Hesselback's triangle. Three boundaries of this triangle are; inguinal ligament below, lateral border of rectus sheath medially and inferior epigastric artery laterally.

Distinguishing between indirect and direct inguinal hernias is merely an academic exercise; treatment for both remains the same. Moreover, this distinction may not be clear till the operation, or the two can co-exist [Pantaloon hernia].

On examination, inguinal hernias are above and medial to pubic tubercle, femoral hernias are below and lateral.

Indirect inguinal hernia can reach the scrotum since it follows the spermatic cord, causing inguino-scrotal swelling. Direct hernias cannot, and hence remain confined to inguinal region only.

Since indirect inguinal hernia comes through internal inguinal ring, blocking this ring will stop the hernia from appearing. The test is called 'Internal ring occlusion test' to differentiate between direct and indirect inguinal hernias.

Internal inguinal ring lies one and a half centimeter above the midpoint between anterior superior iliac spine and pubic tubercle. Reduce the hernia, block the ring with finger and ask the patient to cough. If hernia appears, it is direct inguinal hernia, if not it is indirect inguinal hernia.

Small inguinal hernias are not always apparent. If history is suggestive, it is wise to examination the patient in standing position. If hernia is apparent while lying down, it is not necessary to make the patient stand, exposing him

unnecessarily.

Term ‘Sliding hernia’ is used where fixed bowel such as caecum or recto-sigmoid junction slides through the ring into the sac. They create difficulties during operation.

Ricter’s hernia is when only knuckle of the bowel rather than the whole loop enters the sac. Obstruction is partial in this case.

When the swelling appears to be inguino-scrotal, it is difficult to find the origin. By holding the neck of scrotum between thumb and fingers, if only cord is felt, the swelling is only scrotal, since it is possible to ‘Get above the swelling’. If the cord or the upper end of the swelling is not felt, it is inguino-scrotal.

Painful scrotal swellings are either epididymo-orchitis, which can be treated conservatively; or testicular torsion, which requires emergency surgery.

In orchitis, pain is relieved on elevation of scrotum, in torsion it is increased. Both may have tender angry looking scrotum, especially in children.

Only other cause of pain in scrotum is trauma. Squeezing of testis gives sickening pain. Direct injury leads to Haematocele, causing hard tender scrotal swelling.

Painless swellings of scrotum can be as simple as Hydrocele of tunica vaginalis, usually filarial in origin, giving non tender, soft, fluctuant and translucent scrotal swelling, in which the testis is displaced to one side.

Painless hard swellings in scrotum are the most sinister Testicular tumors; Seminoma or Teratoma. Remember that while scrotal lymphatics drain in inguinal lymph nodes, testicular lymphatics drain in para-aortic nodes.

Other rare swellings in scrotum are hydrocele of the cord, spermatocele, and eididymal cysts.

Head and Neck

Face is the most significant part of body. It is the mirror which reflects personality through various expressions it displays. Eyes are supposed to be the extension of one's brain and thus the mind; they are part of the face. It is said that the way to a person's heart is through stomach; the way to stomach is through the mouth, part of the face. A person's strength and stamina depends on lungs; way to the lungs is through face.

Anatomy of the face therefore has to be consistent with all these demands.

All small muscles of the face are subcutaneous; they do not have bony attachments. Thus they can pull on the facial skin and change expressions in seconds. They are called muscles of expression, are derived from second branchial arch, and are supplied by seventh cranial nerve, the nerve for expression. Eyes and mouth, the two integral part of expression need better control; they are therefore supplied by addition extra circular muscles to control the apertures; the orbicularis occuli and orbicularis oris.

Mouth has an additional function, that of suction. It is vital for infant to suck milk from breasts. Proper feeding requires well developed sucking cup of the mouth. Any defect of mouth such as 'Cleft Lip' hinders this suction function. If roof of the mouth also is defective, as in 'Cleft Palate', milk regurgitates back through nose and the child suffers.

Cleft lip and Cleft Palate, single or both, partial or complete are congenital, developmental, genetic and at times familial defects, which are obvious to diagnose and are important enough to be repaired as soon as possible for proper

growth and development of the child.

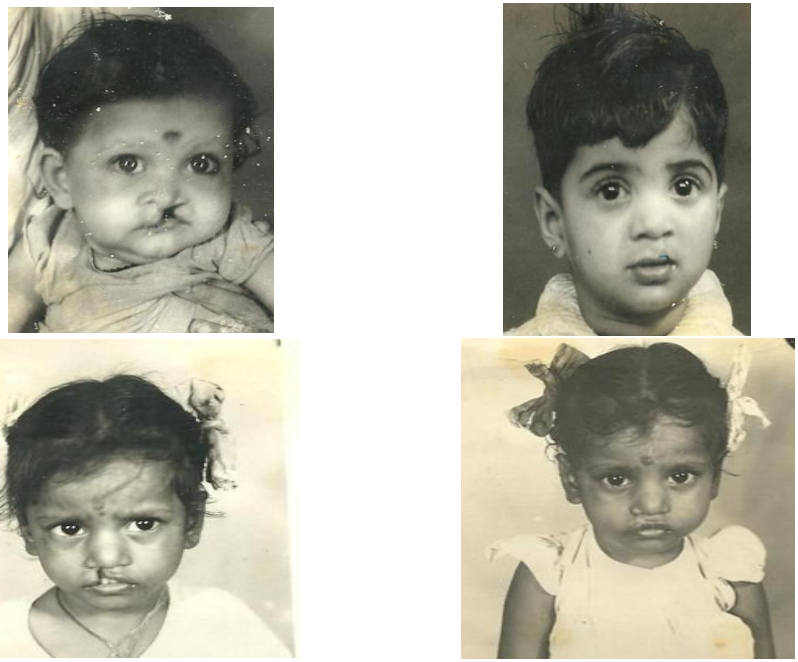
They are also part of the phonation function. If clefts, specially of palate, are not repaired early, speech defects develop such as nasal phonation sounds. Best time to repair therefore is before baby starts to speak.

Cleft lips can be repaired at the age of three months, when tissues are tough enough to hold sutures and pliable enough for required dissection. Till then it is wise to feed the infant in upright position. Repair of cleft palate should not be delayed beyond six months.

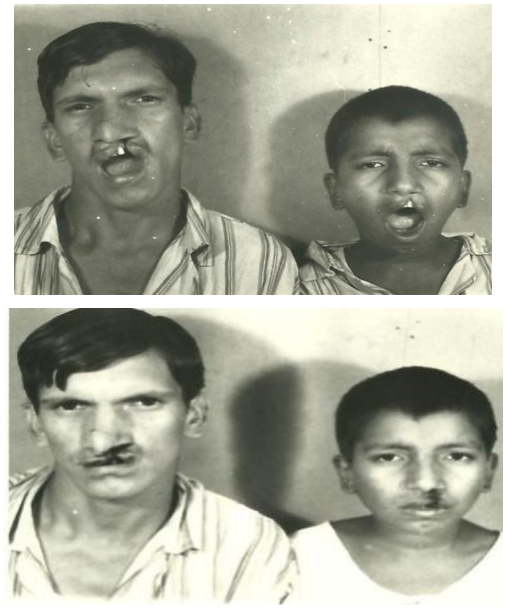
Plastic surgeons agree on three to six months as the best time for the repair of these facial defects.

In some cases defects may persist till adult age due to lack of access to medical facilities. Repair in adults is much more difficult than in children.

Following pictures are cases of cleft lip and palate, before and after repair.



Cleft lips and Cleft Palate; before and after repair



Complete Cleft Lip and Palate in adult brothers, before and after repair

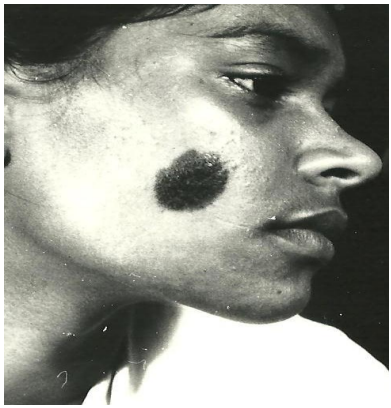
Common lesions on the head are epidermal cysts, arising from sebaceous glands in hairy areas. They may be multiple, firm in consistency, and are attached to the skin by a punctum, the point where once hair was. They contain sebum, a cheesy material. If large, painful or inconvenient while combing, surgical removal is indicated. Dermoids are other type of cysts on head and face. They occur in the lines of fusion and are called sequestration dermoids. Common sites are midline and the outer angle of the eye.

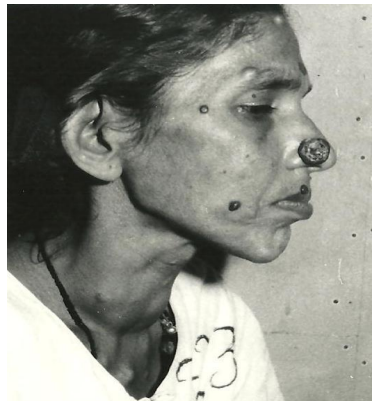
Cystic swelling in the floor of the mouth is called ‘Ranula’. When it extends through hyoglossus muscle into the neck, it is called plunging ranula.

Etiology involves myxomatous degeneration of minor salivary glands in the floor of the mouth. Due to its ramification, excision is difficult. Proper treatment is marsupialisation in the mouth.

Cellulites of floor of the mouth is called ‘Ludwig’s angina’. It is serious because it may lead to laryngeal oedema, respiratory distress and choking. Decompression by sub-mandibular incision, and IV antibiotics can be life saving.

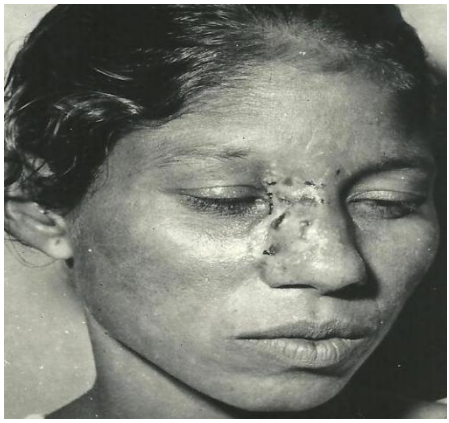
Pigmented lesions are moles/naevi or vascular malformations/haemangiomas. Carbuncles occur at the nape of the neck in diabetics. Excision of the necrotic tissue, antibiotics and control of diabetes is the treatment.

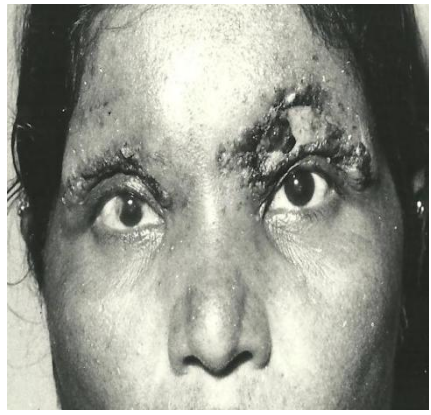




Area above a line from angle of the mouth to the tragus of ear is called 'Danger area'. Cellulites in this area can spread, via angular vein, to the cavernous sinus, causing its thrombosis.

Non-healing ulcer in this area of the face is most likely basal cell carcinoma. It is called 'Rodent ulcer', because of its rolled up edges, nibbling nature which destroying everything in its path. It is locally malignant and metastases are rare. Wide excision can be curative.





Pictures below show two Cases of Basal Cell Carcinoma [Rodent Ulcers].

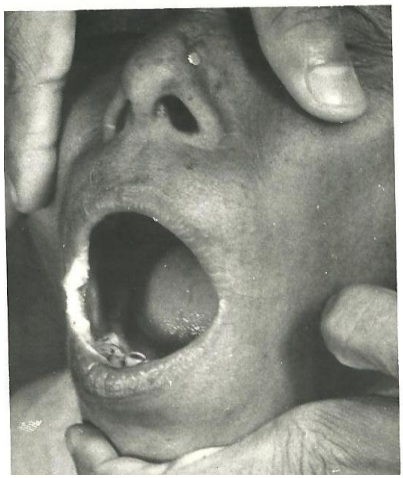
Oral Cavity

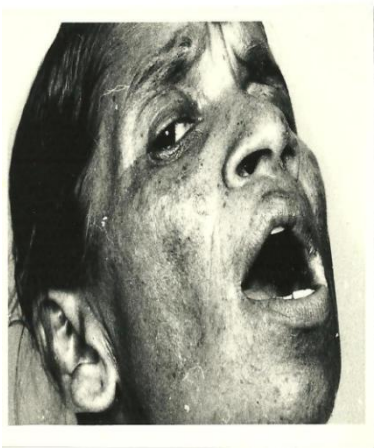
Risk factors for non healing ulcers in oral cavity are the famous Six 'S'. They are, Sepsis, Syphilis, Spirits, Smoking, Spices and Sore tooth.

Long standing chewing of tobacco and betel nuts as in Indian subcontinent and Gatt [chewable herbal intoxicant used by natives of Yemen], are often implicated as the causative irritants. Neoplastic change starts as white color change of mucosa and muco-cuteneous junctions, called 'Leucoplakia'.

These are premalignant lesions of oral cavity. Biopsy is essential. Being early malignant lesions, wide local excision is curative.

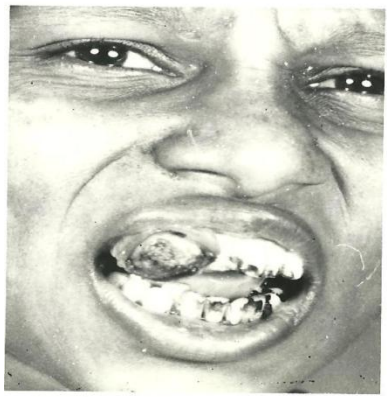
Two patients of leucoplakia, of right and left angles of the mouth.



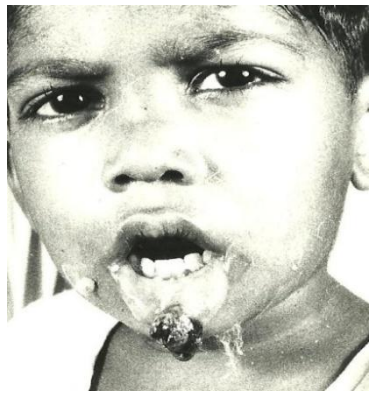


A septic granuloma of the lip bleeds and resembles tumor. Biopsy is necessary.

Benign Tumors of Oral Cavity include Epulis, which is benign growth of the gums. Lesions from teeth can be dental cysts, dentigerous cysts, root abscesses and odontomes.



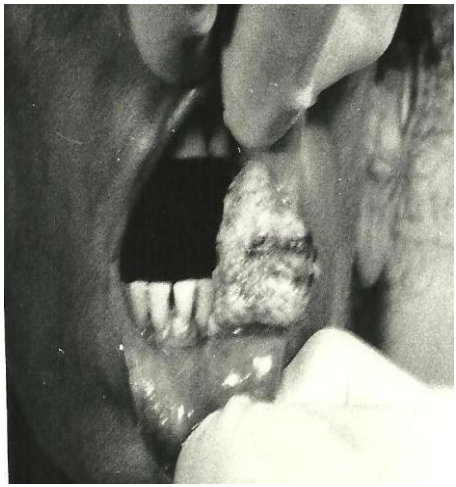
Epulis

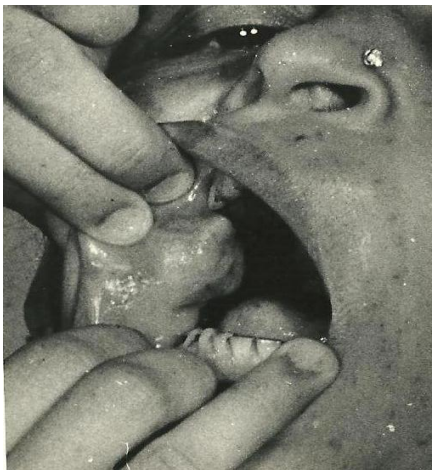


Septic granuloma of lip

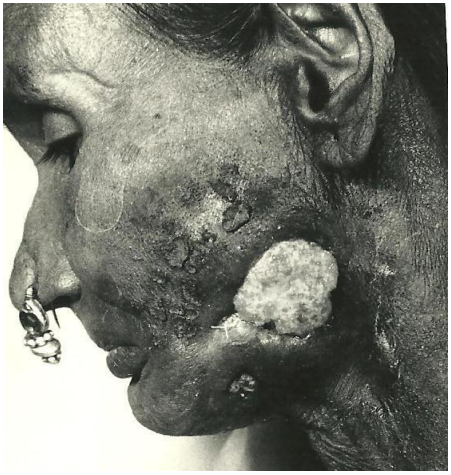
Squamous cell cancers in nodular and ulcerative forms are the commonest malignant oral tumors. Non healing ulcers in oral cavity most likely are squamous cell carcinoma. Usual sites are lips, angle of the mouth, buccal mucosa and the tongue.

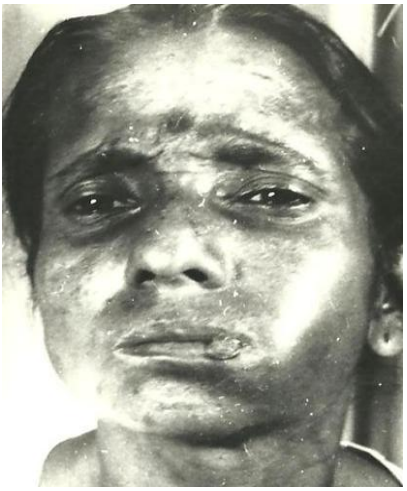
These tumors metastasize in upper cervical lymph nodes. Radical surgery with reconstruction and/or radiotherapy is the treatments of choice. Since these tumors are radiosensitive, radiotherapy is the treatment of choice for inoperable tumors.



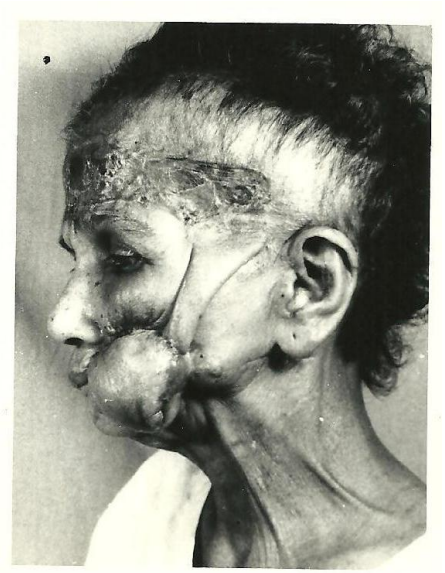


Carcinoma of cheek, ulcerative and nodular, early and late forms.

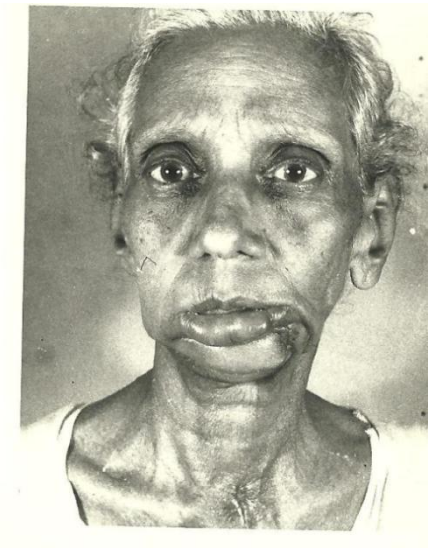




Squamous cell cancers of cheek and lips



Forehead flap



Thoraco-cervical flap

Two methods of reconstruction after wide radical local excision of tumor [From my personal archives of 1975]

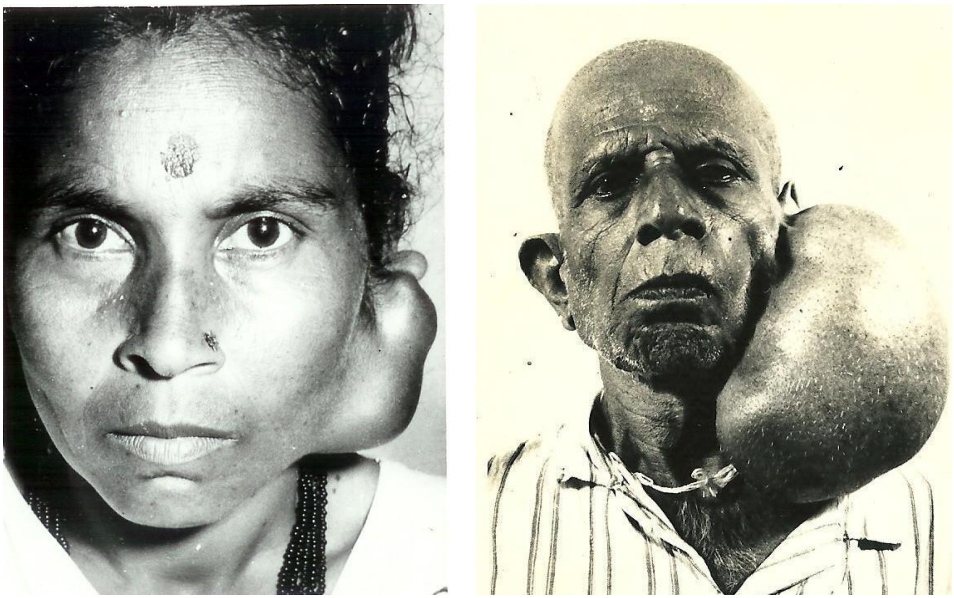
Salivary Glands

The Parotid glands are sandwiched between base of skull, ramus of the mandible and the mastoid process. Superficially it is covered by a tense extension of cervical fascia, called parotid fascia. Its deeper portion lies on the pharyngeal constrictor muscles and the carotid sheath. The lower portion rests on upper part of sternomastoid muscle.

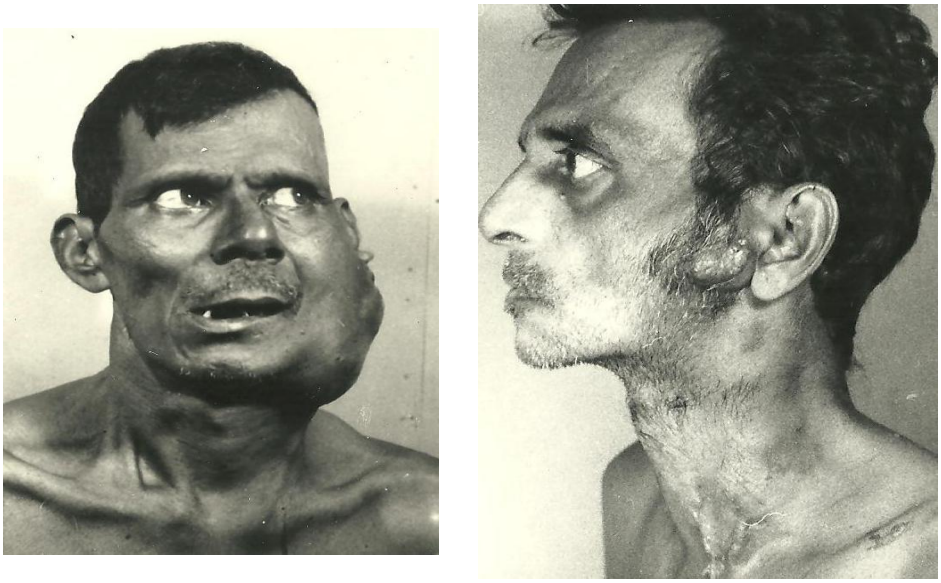
It is arbitrarily divided into superficial and deep portions by neurovascular structures. The external carotid artery passes up and divides into maxillary and superficial temporal arteries, posterior facial vein joins the maxillary vein to form the external jugular vein; and the seventh cranial nerve [facial nerve] enters between two lobes, divides into two trunks, and then in five branches, which supply the facial muscles of expression. Parotid duct [Stenson's duct]

travels between the lobes, passes over the masseter muscle, forwards, downwards and medially to open in the vestibule of the mouth opposite the upper second molar tooth. In addition to glandular tissue, it also contains intra-parotid lymph nodes. Secretion of the gland is watery, and ejects like a jet in oral cavity, in response to olfactory and gustatory stimuli. Because of its easy flowing watery secretions, stagnation and stone formation is rare. Inflammatory lesions are common. Mumps is usually bilateral, viral in origin and self limiting. Acute bacterial parotitis occurs in severe dehydration and debilitating conditions, and presents with throbbing pain and fever. Swelling is obvious but because of tense fascia, fluctuation cannot be felt, even when it is an abscess and pus is present. Decompression by vertical skin incision and dividing the fascia transversely to avoid damage to facial nerve branches can prevent necrosis of the gland. Chronic and recurrent parotitis is a group of conditions causing recurrent pain in the region. Sialography can exclude any ductal obstruction.

Parotid tumors are usually benign, and include pleomorphic adenoma, commonly known as mixed parotid tumor; and adenolymphoma [Warthin's tumor], arising from lymphatic tissue within the gland. Involvement of facial nerve and upper cervical lymph nodes suggests a possible malignant tumor. Treatment is surgical, by superficial or total parotidectomy. Postoperative radiation can prevent recurrence of mixed parotid tumors and cancers.



Mixed parotid tumors [Pleaomorphic adenomas] of varying sizes

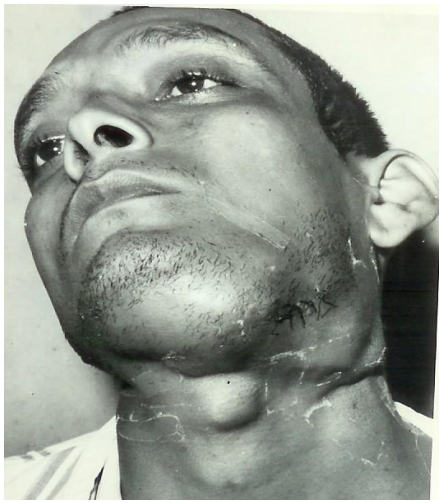


Malignant parotid tumors [with facial palsy]

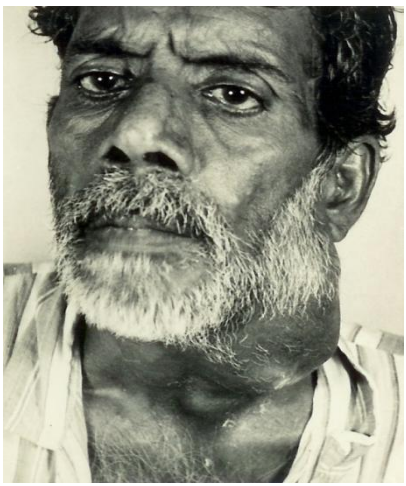
Submandibular salivary glands, as the name suggests, are situated in submandibular area. Posterior border of mylohyoid muscle divides the gland into superficial part in the neck and the deep part in floor of the mouth on hyoglossus muscle. For this reason, the gland is bimanually palpable. Facial artery, lingual and hypoglossal nerves, marginal mandibular branch of facial nerve, and anterior facial vein lie in its close relation. Its duct, Wharton's duct, travels upwards to open in the floor of the mouth, close to the frenum.

Secretions are mucoid and viscid, and because of their antigravity flow, stagnation and stone formation is common. Enlargement of the gland is usually due to chronic sialadenitis with or without stone, and tumors which are usually benign. Stone can be palpated by bimanual examination, and if seen in the terminal duct at the floor of the mouth, it can easily be extracted.

Treatment of chronic sialadenitis and tumors is by excision of the gland.



Tumor, Left submandibular salivary gland



Lymphoma, left upper cervical lymph glands

Sjogren's syndrome is degenerative sialadenitis of unknown etiology and involves all salivary glands. Mihkulicz disease is an autoimmune process which involves salivary glands and the lachrymal glands.

The Neck

Neck is the area between head and the trunk. This cylindrical area is protected by a circular general investing layer of deep fascia under the skin, and the cutaneous muscle called platysma. This fascia splits on both sides to enclose the sternomastoid and trapezious muscles, and superiorly to enclose the parotid glands. Its attachments define the boundaries of neck; superiorly the lower border of the mandible and the mastoid process; and inferiorly the manubrium sterni and the clavicles. Two transverse fascial planes divide the neck in three compartments.

Pre-tracheal fascia runs in front of trachea and the thyroid gland, and splits to enclose strap muscles. Inferiorly it runs behind the sternum till the aortic arch and pericardium. This makes possible for thyroid gland to enlarge downwards behind the sternum. Superiorly it is attached to thyroid cartilage, thus limiting upwards enlargement of goitre. This also makes it possible for thyroid gland to move upwards with the thyroid cartilage [larynx] during the movement of deglutition.

Pre-vertebral fascia runs in front of the vertebral bodies, attached above to base of skull, and below it extends in posterior mediastinum. This fascia splits to form carotid sheath, which encloses the carotid vessels and the vagus [10^{th}] nerve.

Between these two transverse fascias is the visceral compartment in which lie the trachea and oesophagus, thyroid and parathyroid glands and anterior group of deep cervical lymph nodes. Unlike thyroid gland, these nodes are not

attached to larynx; hence do not move with swallowing [deglutition].

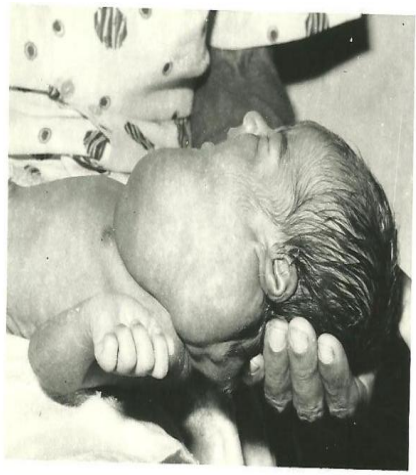
The sternomastoid muscles divide the neck in anterior and posterior compartments. The anterior compartment is further divided by diagastric and omohyoid muscles into submental and digastrics triangles; and suprahyoid and infrahyoid compartments.

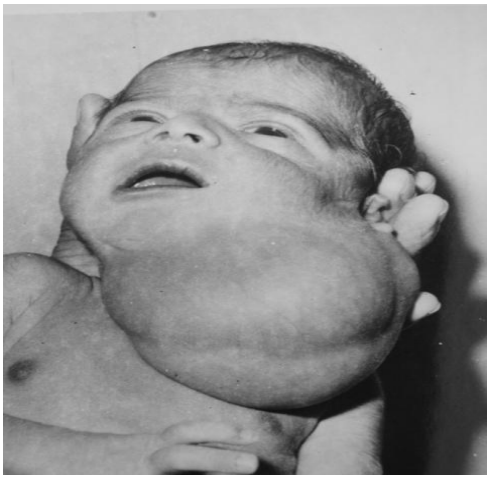
Most important lesions in the neck are cervical swellings of various origins.

In children, branchial cysts may be found close to sternomastoid muscle in the upper region. A branchial sinus/ fistula, however opens much lower down on the surface and the track runs upwards and medially between internal and external carotid arteries and cranial nerves and ends in peri-tonsillar fossa. Both these conditions are embryological remnants of second branchial cleft.

Thyroglossal cyst occurs in the remnant of thyroglossal tract, which is attached to foramen caecum, a point in mid line at the junction of anterior two third and posterior one third of tongue, from where thyroid embryologically develops. For this reason, these cysts move up with protrusion of the tongue.

Cystic hygroma is also known as the cavernous lymphangioma. This lesion is due to cystic dilatation of developing lymph channels and is found in the lower part of posterior triangle, and may extends into axilla. It is soft, cystic and brilliantly translucent. Hence it is sometimes called ‘Hydrocele of the neck’.





'Cystic hygroma' in children

Sternomastoid tumor is not a tumor but tumor like hard swelling in the middle of that muscle due to some trauma to muscle during birth. It leads to torticolis, [tilting of the neck].

Most common swellings in neck are glands, salivary glands, lymph glands, and endocrine glands.

Cervical lymph nodes are arranged in chains. Horizontal chain consists of submental, submandibular, pre-auricular, post-auricular and occipital nodes. Vertical chain is made up of upper and lowers deep cervical nodes, also called juglo-digastric and juglo-omohyoid groups in anterior triangle and supra-clavicular nodes in posterior triangle.

In addition to these, an additional horizontal chain of lymphatic tissue is placed in the throat; two tonsils laterally, adenoids posteriorly and a mass of lymphatic tissue anterioly on the surface of posterior third of tongue. This is called 'Waldayer's ring'.

Lymph nodes enlarge in response to either infections, or cancers in their

draining area. Hence their enlargement is invariably ‘Secondary’, to infection or cancers, carcinoma or melanoma. Primary enlargement of lymph nodes is due to a tumor called ‘Lymphoma’.

Acute lymphadenitis is always secondary to acute infections in the area drained by that group of lymph glands. Glands are enlarged and tender.

Chronic lymphadenitis is most likely due to tuberculosis. Peri-adenitis in tuberculosis results in matting of the glands. Caseation leads to abscesses which lack signs of acute inflammation; hence are called ‘Cold abscess’. They are situated below deep fascia, and if they break through it, they present as ‘Collar stud’ abscesses.

Lymph node enlargement, in the absence of infection, is almost certainly due to neoplasm. They are secondary metastases if localized to one group and if there is a lesion in the area drained by them. If there is no malignant lesion in drainage area, primary lymph node tumor like lymphoma is the most likely diagnosis. Other group of lymph nodes, and liver & spleen may also be enlarged.

Supra-clavicular nodes on the left side are called Virchow’s nodes. If enlarged, they may be due to secondary metastases from stomach or testes, cancer cells reaching these nodes via Cysterna chyli and the thoracic duct.

A swelling in posterior triangle is most likely a lymph node. In upper part of posterior triangle, they are either nonspecific or due to such simple problems like dandruff or lice in the hair, or are due to tuberculosis. Fine needle aspiration cytology or biopsy is advised for persisting or enlarging nodes.

Lipoma is the only other swelling in this area. Well defined, soft, non tender, mobile, subcutaneous swelling whose edges slip under examining finger is most

likely a lipoma. They may be left alone, or removed if bothering the patient. Their malignant potential is almost none.

A swelling in submandibular triangle is either salivary gland or lymph nodes. Bimanual examination can easily differentiate between them. Salivary gland is bimanually palpable, lymph nodes are not. Examination of oral cavity, throat, nose and ear is mandatory.

Swelling in anterior triangle most likely is lymph node or goitre. One test can differentiate. Ask the patient to swallow, observe and palpate. If swelling moves with swallowing, it is thyroid; if not, it is lymph node.

Other swellings are extremely rare. Carotid body tumor is so small that it is hardly palpable, and so rare that it should be the last to be mentioned.

Enlarged palpable nodes [lymphadenopathy] in this area are either tubercular or secondary metastases from thyroid, pharynx, larynx, oesophagus, breast and apex of lung. US and CT scan are useful in diagnosis. FNA and/or biopsy will confirm the diagnosis. Treatment is that of primary lesion.

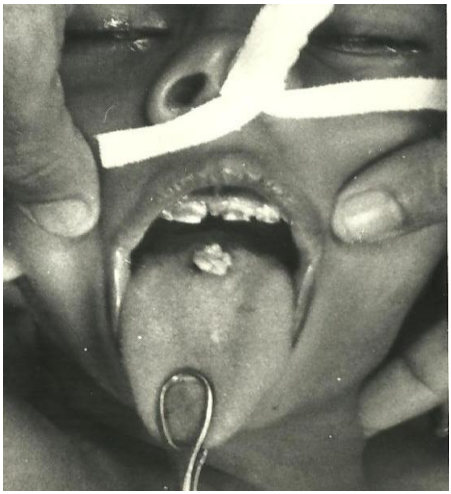
Painful tender lymph nodes with fever are secondary in infections in mouth or throat.

Thyroid Gland [Goitre]

Thyroid is an endocrine gland. Its secretions regulate the basic metabolism in the body. Iodine is the precursor of thyroid hormones. Normal supply of iodine is essential to maintain normal levels of thyroid hormones and a euthyroid state of the body.

Thyroid develops at Foramen Caecum which lies in mid line at the junction of anterior two third and posterior one third of the tongue. It descends along

thyro-glossal tract and comes to rest, below cricoid cartilage, on the upper tracheal rings, covered by pre-tracheal fascia. However, when thyroid gland enlarges, it can easily descend in pre-tracheal fascia, all the way down till aortic arch. [Retrosternal goitre] Failure to descend may cause an extremely rare condition called ‘Lingual thyroid’, a small swelling that lies at Foramen Caecum. Presence of normal gland should be ascertained before removing it, since this may be the only thyroid tissue in the body.



A rare case of lingual thyroid

Four parathyroid glands and the recurrent laryngeal nerves lie posteriorly in close relation with the gland, and are vulnerable to trauma during thyroid surgery.

Enlargement of thyroid is called ‘Goitre’. Normal thyroid gland is neither visible nor palpable.

To diagnose goitre, neck must be inspected from front and palpated from behind, while patient is asked to swallow. Goitres move with swallowing, visibly and palpably. This is an essential diagnostic test.

Features of swelling on inspection and palpation are described as in any other swelling.

Special attention is paid to its lower margin, if not clearly defined; it indicates retro-sternal extension. This can also be confirmed by dullness on percussion on, and by the sides of upper sternum, and by Pemberton sign [dyspnoea, congestion of face and prominence of neck veins on raising both hands above the Head].

Auscultation over the gland may reveal a bruit in very vascular goitres, such as Grave's disease.

Thyroid is an endocrine gland. Its hormones control the metabolism and 'Maintain normal basal metabolic rate in the body'.

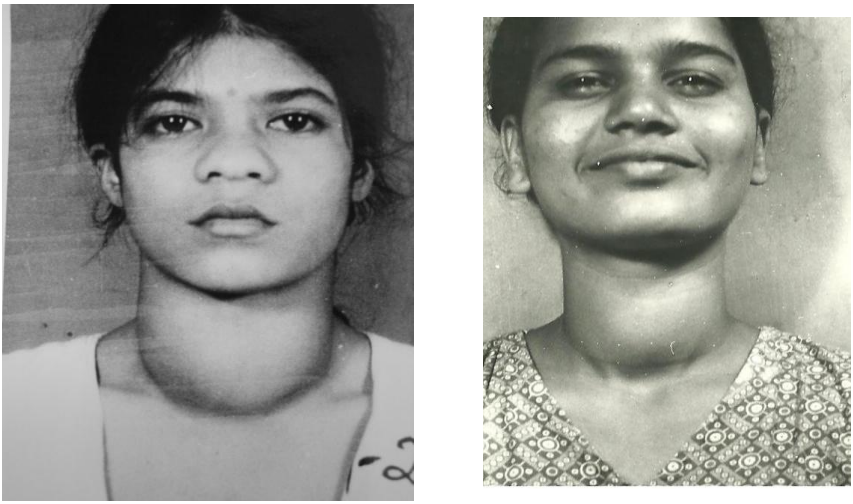
While making the diagnosis of goitre, few things must be noted.

Morphologically thyroid enlargement may be unilateral or bilateral, smooth or nodular, single or multiple nodules.

Functionally thyroid status may be hypothyroid, euthyroid or hyperthyroid.

Pathologically goitre may be simple, toxic, inflammatory, or neoplastic.

Simple goitres are based on the principle of demand and supply. In certain physiological states like puberty, pregnancy, and lactation; metabolic demands for thyroid hormone are increased, requiring more thyroxin. Thyroid uniformly increases in size to meet this demand and maintain the euthyroid status; thus causing what is termed 'physiological goitre'. [Pictures below]



Physiologoical goitres

Once the demand is over, gland regresses to its normal size. In some cases, it may remain enlarged even after the demand is over. Excess secretion, no longer required in circulation, remains stored in the form of colloid in enlarged and dilated acini. Functional status remains euthyroid. Again the enlargement is uniform, bilateral and smooth.

Such goiters are termed as 'Parenchymatous or Colloid goitres'.

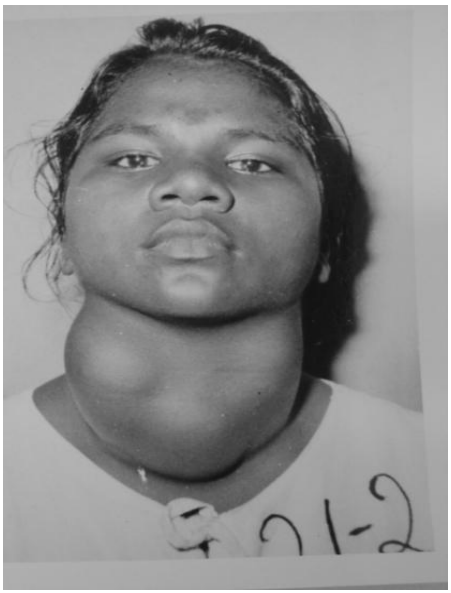
Iodine is an essential requirement for maintaining euthyroid status. There are geographical areas such as mountainous regions, where iodine is deficient in food and drinking water. On the other hand in coastal areas, there is plenty of iodine in sea food and water, but it is not fully metabolized due to impurities like nitrites and nitrates in drinking water. In all such endemic areas, families as a whole suffer from iodine deficiency.

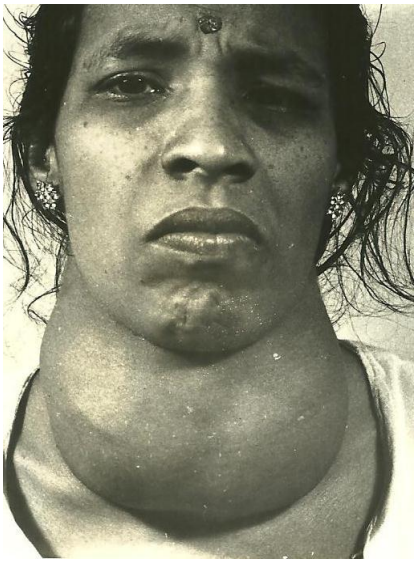
Low levels of iodine increase thyroid activity through thyroid stimulating hormone [TSH], whose levels in blood rise significantly. To maintain euthyroid status, thyroid acini multiply and hypertrophy; and different areas of gland work

in shifts to produce required quantity of hormones.

Gland therefore enlarges in size and takes nodular form. Such goiters are called ‘Endemic goiters, iodine deficiency goiters and multi-nodular goiters’.

In endemic areas such endemic goitres may take enormous size, look ugly and press on trachea and oesophagus, causing dyspnea and dysphagia.





Multinodular goitres

If diagnosed in early stages, TSH suppression with thyroxine may control, or even reverse the goiter. In endemic areas, iodine in any form, usually iodised salt, can be prophylactic.

Surgery is indicated to debulk and reduce the size for cosmetic reasons or to relieve pressure symptoms. Just enough portion of the gland is removed by ‘Partial thyroidectomy’, to achieve these objectives.

In long standing goitres, tracheal osteomalacia may develop causing

respiratory problems even after operation. This may require tracheostomy.

Thyroiditis or inflammations of thyroid are quite rare.

'Acute thyroiditis' is bacterial in origin and usually accompanies acute bacterial throat infections. Gland is enlarged and tender, accompanied by fever. It responds to antibiotics.

Subacute thyroiditis or De'Quervein's disease is even rarer. Etiology is unknown, treatment is symptomatic.

Lymphocytic thyroiditis is called Hashimoto's disease. Lymphocytic infiltration of the gland affects the function, which with time suffers, and becomes hypothyroid. Autoimmune hypothesis is claimed to be responsible for the condition. Estimation of thyroid antibodies in serum and FNA can help in diagnosis.

Supplement by thyroxine can keep the swelling in check, and may even reduce it. Surgery is contraindicated for the fear of increasing the hypothyroidism.

In old age most of the gland may be replaced by fibrous tissue, due to an unknown etiology. Condition is called 'Riddle's thyroiditis'. Gland is nodular and very hard, making it difficult to differentiate from malignant tumor. Only histology by FNA can confirm the diagnosis. Hypothyroidism is associated.

Sometimes, otherwise normal thyroid gland, for no known reason, either in response to long standing thyroid stimulator [LATS] hormone, or as a result of an autoimmune process, becomes hyper active and hyper functioning; manufacturing and releasing in circulation, more hormone than required.

Such gland enlarges, maintaining its uniform shape and surface; and being

very vascular, clinically presents thrill and bruit. The condition is called ‘Primary thyrotoxicosis or ‘Grave’s disease.

If however similar changes happen in a gland which already has been suffering from nodular goiter, the condition is called ‘Secondary thyrotoxicosis’. In this condition, gland is nodular, and not very vascular. Cardiac symptoms predominate over others.

Sometimes only one nodule becomes toxic rather than the whole gland. Such nodule is called ‘Hot nodule’.

In toxic goiters, increased levels of thyroid hormone in blood affect all the systems of the body, enhance their metabolic activity and make them hyper-excitable.

Symptoms and signs of toxic goiter are based on this hyper-excitability state of all systems of the body.

Hyperactivity of central nervous system causes anxiety, irritability, and insomnia; that of autonomic nervous system causes heat intolerance, excessive sweating, increased appetite and yet loss of weight.

Hyperactivity of circulatory system manifests with palpitation, tachycardia and even cardiac arrhythmias. Clinically, ‘Sleeping pulse rate’ is the best bedside examination to diagnose toxic goitres.

Hyperactivity of GIT manifests as diarrhoea.

In females it causes menstrual disturbances, even amenorrhoea.

Musculoskeletal system responds with hyper excitability of muscles, fine tremors in hand and hyper reflexia of tendon jerks. Pretibial myxoedema is associated but cause is not known.

With hyper excitability comes early exhaustion and fatigue of muscles. Most delicate muscles like orbital muscles are affected early, leading to eye signs, which are predominant in primary thyrotoxicosis. These are exophthalmos, lid lag, lid retraction, and absence of forehead wrinkling while looking up, exophthalmia, lack of convergence, diplopia and even nystagmus. In advanced cases, exposed cornea may develop exposure keratitis and corneal ulcers.

Treatment of primary hyper-thyroidism is medical with anti-thyroid drugs. Uncontrolled or relapsing cases require surgery. Subtotal thyroidectomy is the operation of choice removing most of the gland, leaving just enough for daily requirement of hormones.

Preoperative preparation tries to achieve as much euthyroid status as possible. Anti-thyroid drugs increase vascularity of the gland and result in excessive bleeding during operation. These should be stopped prior to operations and drugs such as Lugol's iodine are prescribed for a few days. Beta blockers control the cardiac effects of thyrotoxicosis without increasing vascularity, and are useful in pre-operative preparation.

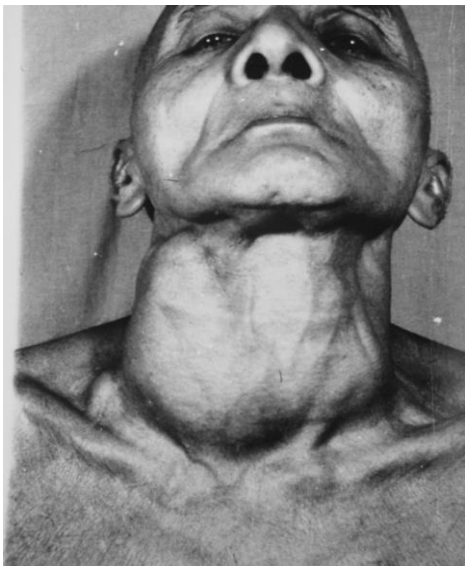
Thyroid neoplasms include benign adenomas and malignant carcinomas. Adenomas are either follicular or papillary; similarly carcinomas are also follicular, papillary or undifferentiated anaplastic variety. Carcinoma arising from para-follicular 'C' cells is called medullary carcinoma.

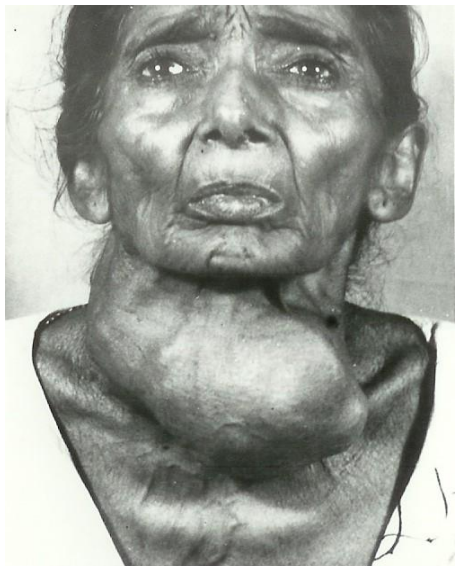
Apart from histological appearances, invasion of capsular vessels by tumor cells differentiates between benign and malignant lesions.

Clinical presentation is with progressively enlarging goiter, which is hard and has irregular surface. Tumors may directly invade surrounding structures. Hoarseness of voice is due to involvement of recurrent laryngeal nerve and is a feature of malignancy.

Lymphatic spread is to cervical lymph nodes in anterior triangle which may be enlarged, palpable and hard in consistency. Spread may extend to the nodes in posterior triangle, causing what was earlier called ‘Aberrant thyroid’.

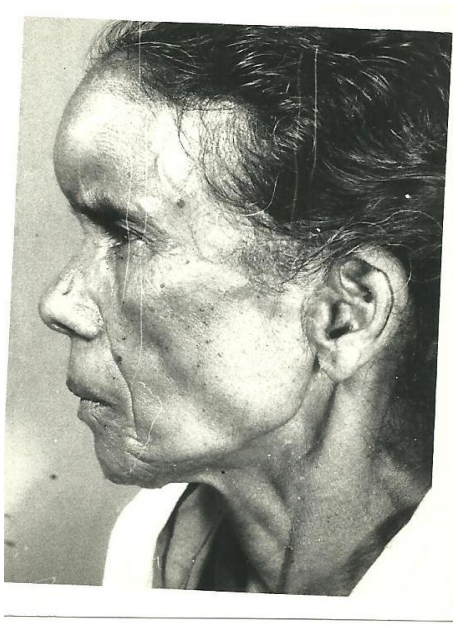
Tumors, large in size, may compress blood vessels in the neck, leading to their engorgement. Pressure on, or direct invasion of, trachea and oesophagus may lead to dyspnoea and dysphagia.

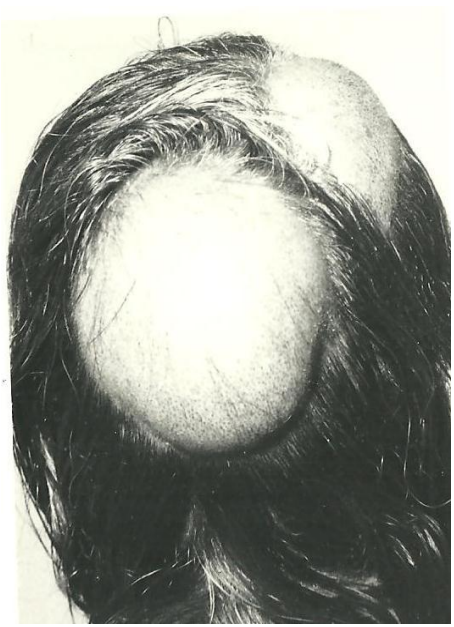


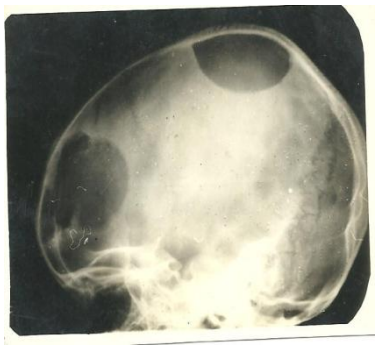


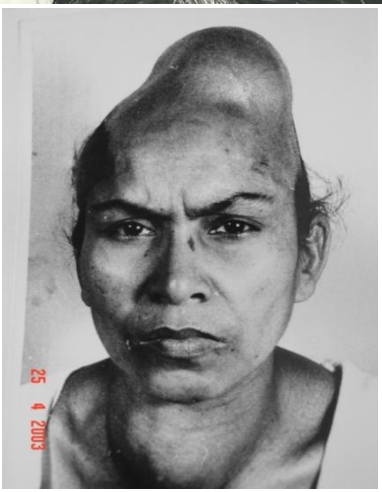
Carcinoma of thyroid with venous compression

Blood borne metastases can be found in lungs, liver and bones, especially flat bones of the skull. Bony metastases are osteolytic in nature. [Pictures below]









Medullary tumors have additional features caused by calcitonin secreted by para-follicular cells. They include flushing, tachycardia and diarrhea. They may be part of the MEN syndrome complex.

Thyroid tumors may have multicentric foci of origin in both the lobes, or intra-glandular lymphatic spread may involve both lobes. This affects the treatment, which requires total thyroidectomy, and radical neck dissection if regional lymph nodes are involved.

In benign tumors limited to one lobe only, 'Lobectomy with removal of isthmus' is sufficient. However if histology suggests capsular involvement or frank malignancy, 'Completion thyroidectomy' may have to be performed.

Papillary cancers are very slow growing and have good prognosis.

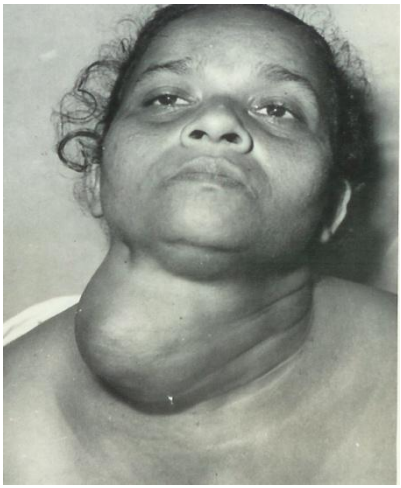
Lifelong TSH suppression with thyroxine is an alternate option to completion thyroidectomy in elderly patients.

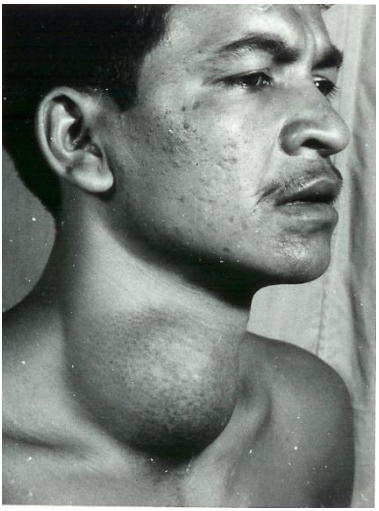
In principle, preoperative diagnosis of follicular tumor requires lobectomy with removal of isthmus; while papillary, anaplastic and medullary tumors require total thyroidectomy with or without radical neck dissection.

Thyroid operations may injure the recurrent laryngeal nerve, leading to hoarseness of voice. Preoperative laryngoscopy is essential to ascertain the status of vocal cords, especially for medico-legal purposes.

Parathyroid glands may also be injured or their vascularity may be compromised leading to postoperative hypocalcaemia and tetany.

Solitary thyroid nodule is a diagnostic dilemma.





It could be as simple as a colloid cyst or a prominent nodule of multinodular goitre. Functionally it may be toxic hot nodule or benign cold nodule. It may be an adenoma or frank carcinoma. Large adenomas may cause tracheal shift to the other side.

Sudden painful enlargement in otherwise painless nodule suggests haemorrhage in the nodule. Ultrasound and FNA help in diagnosis.

It is safer to remove a solitary thyroid nodule since it cannot be predicted as to when it may develop complications of haemorrhage, toxicity or malignant change.

Investigating a case of goitre.

Thyroid function tests are the basic laboratory investigations in goitres. High TSH suggests simple [metabolic] goitres. Increased T3 and T4 suggest toxicity. Serology is required if autoimmune disease is suspected. X-rays of neck and chest, PA and lateral views help in diagnosing cervical goitre, any tracheal deviation, and retrosternal extension.

Imaging by US and CT scan helps in determining the nature and extent of the lesion. Skeletal survey can detect bone metastases which are osteolytic in nature.

Pre-operative laryngoscopy to check the status of vocal chords is of medico-legal importance.

FNA can provide diagnosis with reasonable certainty. Still histological surprises are common.

Since iodine is the base element for thyroid functions, nuclear isotope scan can differentiate between hot [toxic] and cold nodule [either cyst or malignancy]. Radio-iodine isotopes are also used for the treatment of postoperative recurrence of toxic goiters. Advanced and recurrent tumors can be treated by radio-isotopes or deep x-ray radiations. Treatment of blood born metastases requires that all thyroid tissue is first ablated so that isotopes are concentrated in metastases.

Thyroid surgery may have significant post-operative complications. Haemorrhage in the confined operative field is an important complication in immediate postoperative period, leading to chocking and respiratory difficulty. Immediate decompression by removing the clips/stitches is life saving. Re-exploration may be required to stop the bleeding which usually is due to slipped ligature on major vessels. Hoarseness of voice and hypocalcaemia can occur in early post-operative period if recurrent laryngeal nerve or parathyroid glands are damaged. Serum calcium should be checked routinely in post thyroidectomy period so that it can be diagnosed before the symptoms of tetany and carpo-pedal spasm develop. Late complications include hypothyroidism.

Parathyroids

Hyperparathyroidism is of surgical interest. Etiology may be hyper-function of all the glands due to unknown etiology, or adenoma of one or more glands.

Levels of parathormone in blood increase in this condition, leading to mobilization of calcium from bones.

Hypercalcaemia leads to symptoms which are classically describe as, 'fragile bones, renal stones, abdominal groans and psychic moans'. The patient may have swelling and pain in small joints, and even fractures of small bones; and formation of calcium stones in kidneys. The x-rays of hand may show bone rarefaction and bone cysts in small bones of the hand.

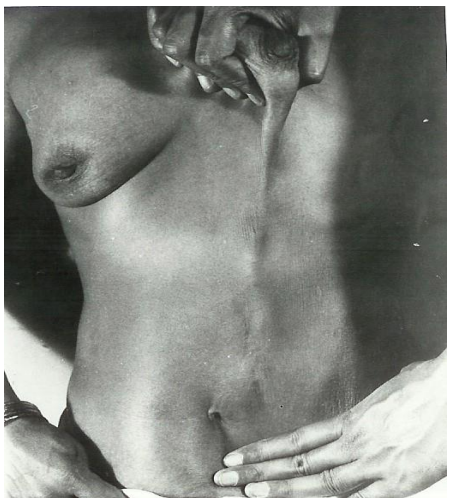
Preoperative localization of the lesion is invariably a problem. Exploration of the neck may provide the final answer. If not found at expected positions, exploration may have to extend into the superior mediastinum, where they may be lodged developmentally. Frozen section facility during operation is vital to recognize parathyroid tissue which is usually very small and closely resembles fat globules.

Single gland adenoma is removed and other glands are exposed and inspected. In hyperplasia of all the glands, all four glands will have to be explored and removed. Serum calcium levels are constantly monitored during surgery. A small portion of the gland may be transplanted into the strap muscles to avoid postoperative hypocalcaemia. Many patients may require lifelong calcium therapy to maintain normal calcium levels.

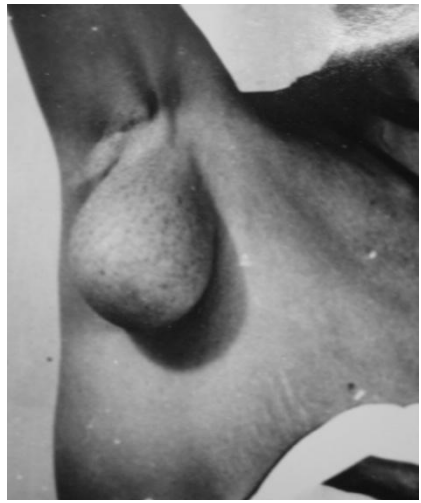
The Breast

Breasts are a special feature of mammals ['MAMA' refers to breasts]. All

mammals have milk lines that run from axilla to groin, with varying number of nipples along this line in order to suckle the new born. In human females only two breasts develop. In males they remain rudimentary. In some females, accessory breasts can develop anywhere along the milk line. However, the commonest site for accessory breasts is axilla.



'Milk line' [Very rare picture in my personal archives]



Accessory breast in right Axilla

Breasts are subcutaneous glands, one on each side on the chest, lying over the 2nd to 7th ribs on the pectoral muscles and fascia. Each has a nipple surrounded by dark skinned areola and10-12 lactiferous ducts which open on each nipple. There are few glands at the margin of areola called Glands of Montgomery.

The breast tissue consists of glandular acini, fat, elastic and fibrous tissue; their proportion varying with age and fertile period. Shape and size of breasts also vary accordingly. The interior of the breast is divided into compartments or lobules by fibrous bands called Cooper's ligament attached from skin to pectoral fascia.

Lymphatic drainage of the breast is of great significance in breast cancers.

Basically all lymphatics drain into the axillary group of lymph glands.

The sentinel node is described as the first node draining the tumor bearing area. It is therefore gaining lot of importance in determining the spread of tumor and therefore affecting the surgical management. Different quadrants of breast also drain into the nearest group of lymph nodes; like medial ones in the internal mammary chain, lower ones into the coeliac group of glands, and upper ones in supraclavicular glands.

Female breasts respond to hormones at puberty, pregnancy and lactation, by sudden increase in size, as a result of hypertrophy and hyperplasia of glandular acini, which secrete, store and release milk. This process is reversed at menopause when atrophic changes set in.

Main symptoms in breast diseases are pain, swelling and nipple discharge. Pain indicates congestion or inflammation. It is normal for breasts to be heavy and painful at puberty, pregnancy and lactation.

Unilateral pain in breast, associated with fever is acute mastitis, usually seen in lactating breasts. Organisms are Gram positive Cocci, entering through cracked nipple while suckling the baby. Breast support and antibiotics is the treatment. Breast abscess follows in untreated or uncontrolled cases. Throbbing pain suggests abscess. Superficial ones present with classical signs of inflammatory swelling. Deep ones require confirmation and localization by ultrasound. Incision and drainage is the treatment of choice. When the cause of abscess is not clear, it is advised to take a biopsy from the edge of the abscess wall while draining.

The term chronic mastitis includes many specific and nonspecific pathological conditions. Presentation is with recurrent abscesses, discharging sinuses, and non healing ulcers. Differentiation from tumors is not always easy.

The only helpful investigation is biopsy. Treatment is not always satisfactory.

Fibrocystic disease or fibroadenosis of the breast is the consequence of cyclical changes that the breasts go through during the fertile period. In this condition neither the diagnosis nor the treatment is always satisfactory. Differentiation from tumors is even more difficult. Only symptomatic treatment with breast support and analgesics is required.

Physiological discharge from the breasts is milk. Any other discharge is abnormal and indicates some form of pathological changes in breasts.

Blood stained discharge from the nipple nearly always indicates tumor; either duct papilloma or ductal carcinoma.

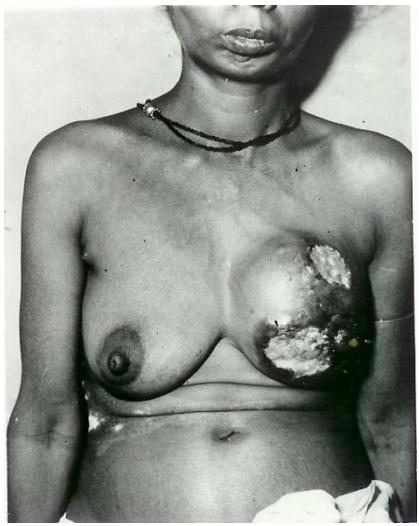
Milk may collect in the breast in a cystic form called galactocele, which are very prone to secondary infection. Simple extraction with a breast pump is helpful.

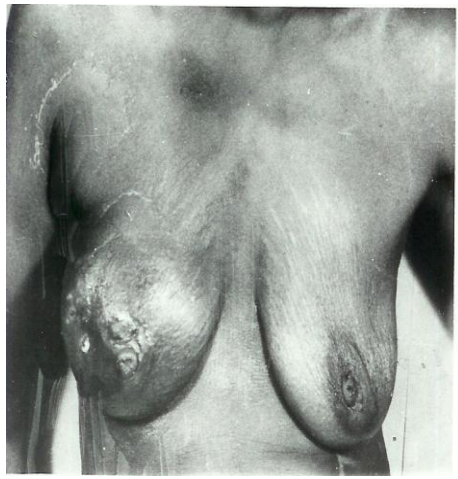
Swelling is the commonest presentation of breast diseases. Swellings can be 'Of the breast', as in mastitis; 'On the breast', as in 'cysts of glands of Montgomery' around the areola; or 'In the breast' as breast tumors.

Painless swellings are of the worst kind because of their reputation for being malignant. They may accidentally be discovered while bathing or dressing, and may be ignored with worse results.

First dictum; 'Swelling in the breast is cancer, unless proved otherwise'.

Breast cancer is the commonest killing cancer in women. It is a pity that tumors of so superficial an organ as breast remain undiagnosed till late. Social customs and hesitancy on part of women contribute a lot to this unfortunate situation.





Advanced carcinoma of breast

Early diagnosis is the key to reducing mortality from breast cancer. Periodical screening of entire female population at risk, like those with strong family history in close first and even second blood relations, can achieve this goal. Current trends in genetic profiling and gene mapping can identify potential candidates for breast cancer.

Second dictum; 'Earliest possible diagnosis and complete combination therapy can cure the disease, which so far has been considered incurable'.

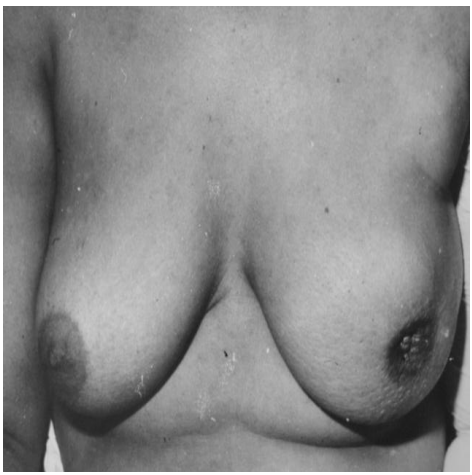
Screening for breast cancer has three steps; clinical examination, mammography and FNA. [Triple examination]

Clinical examination of breasts requires semi sitting position and exposure of both breasts of patients. Normal breasts are equal, symmetrical in shape, size and color; with nipples pointing downwards and outwards. On inspection, any deviation from normal is noted. Patient is asked to bend forwards and then to raise both arms above her head. Once again any difference in shape, size and position between the breasts is noted. Restricted movement of one breast

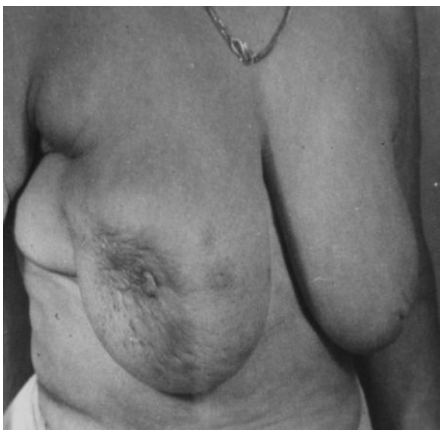
suggests tumor. Retraction of both nipples may be congenital and is present since childhood. Retraction of nipple in adults suggests tumor underneath. This is due to infiltration of lactiferous ducts by tumor.

Puckering of skin may be due to tumor infiltrating Cooper's ligaments. 'Peau de orange' appearance suggests lymphatic infiltration by tumor causing lymph stasis and oedema of skin.

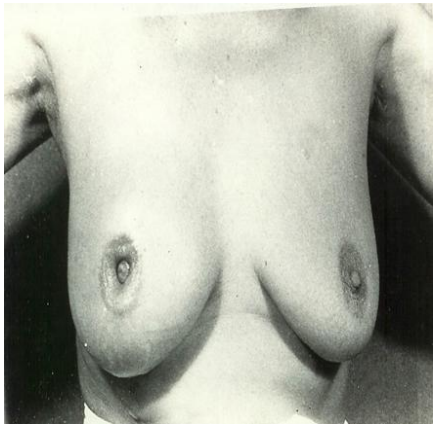
Excoriating lesion of the nipple and areola is Paget's disease. It is unilateral, does not itch, and does not heal. This is opposed to eczema of nipples which is usually bilateral and itching is present. Histology shows typical foamy cells called Paget's cells. Condition denotes an underlying carcinoma which is not yet palpable.



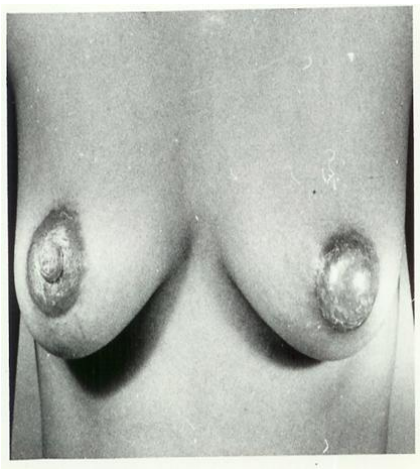
Unilateral nipple retraction



Peau D' Orange appearance



Pagets disease right breast



Bilateral eczema

Breasts are palpated by flat of the hand, starting with the normal one. Systemic palpation of all five quadrants [upper medial & lateral, lower medial & lateral, and nipple & areola] is followed by palpation of axilla for lymph nodes.

If any swelling is palpable, its features are recorded just like in examination of any swelling in the body. Consistency and mobility are of special interest. Hard swellings with restricted mobility suggest tumor. Inability to pinch skin over the swelling suggests skin infiltration by tumor. Similarly if a mobile swelling becomes restricted in movement when pectoral muscle is contracted, it suggests deeper infiltration by the tumor. Placing the hand on loin and pressing it hard makes the pectoral muscle contract. Tumor is than palpated for mobility.

Examination is completed by palpating the neck for supra-clavicular nodes, abdomen for hepatomegaly or epigastric swelling, and chest for any abnormality.

Bilateral mammogram is the next step. Any radiological difference between the two breasts is noted. Increased density, micro-calcification, and evidence of

infiltration of skin or fascia are signs that suggest tumor.

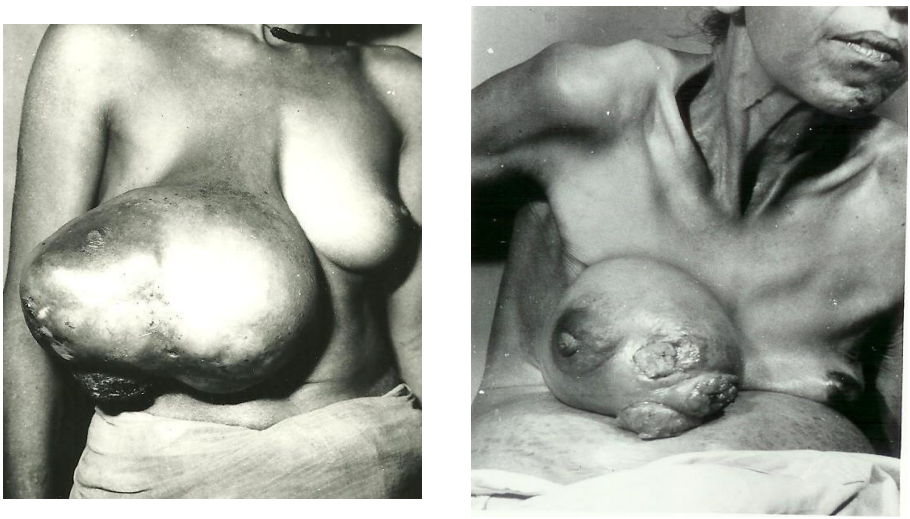
FNA is performed on clinically palpable lesions. Imaging guided FNA is required on suspicious lesions seen on mammogram.

Breast Tumors

Commonest benign tumor of breast is fibroadenoma. These are small, well capsulated, tumors of varying consistency. Common in young females, they are also known as ‘Breast mouse’, because of their free mobility. Small ones may be left alone, unless patient insists on their removal.

Rarely soft fibroadenomas may grow to enormous size, ulcerating, fungating, and filling almost whole breast. Although benign, they look ominous; hence they are called cystosarcoma phylloides, or simply ‘Phylloides tumour’.

Removal of the breast with the tumor is indicated.



Phylloides tumors of the breast

Most breast cancers originate from duct epithelium and are called ductal carcinomas. Other rare tumors are lobular carcinoma.

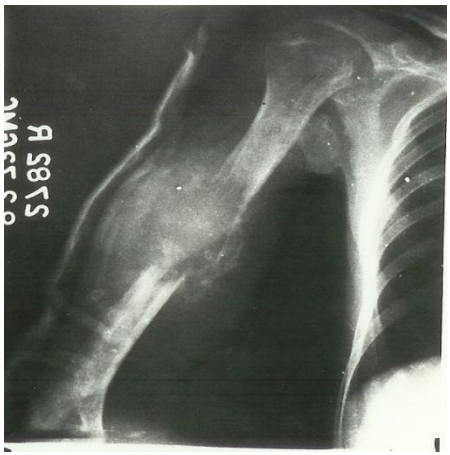
Inflammatory carcinoma occurs in pregnancy or in lactating breasts. It has nothing to do with inflammation; it just presents like mastitis or abscess. It has bad prognosis.

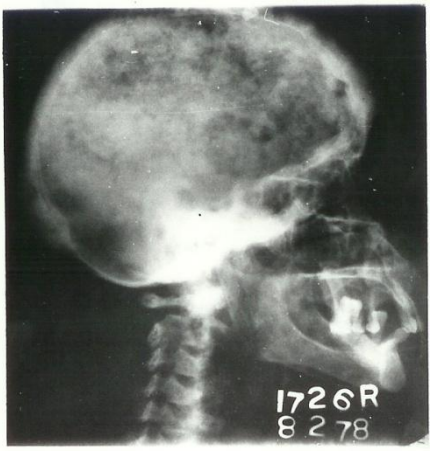
Cancer of the breast starts as dysplastic changes in epithelium of the mammary ducts. These changes become anaplasia with time, and frank carcinoma develops.

These are the earliest tumors and are called 'Ductal carcinoma in situ' [DCIS]. Since this anaplastic growth is not confined by any capsule, direct infiltration of surrounding tissues start and tumor continues to grow in size. Direct infiltration therefore is the commonest mode of spread for breast cancer.

Cancer cells strike lymphatic ducts soon, which are more abundant than the blood vessels. Lymphatic spread therefore is the next common mode of spread followed by blood spread. Closer is the lymph node, quicker is its involvement; sentinel nodes are first to receive cancer cells, which later reach the axillary nodes and beyond, to supra-clavicular nodes. Tumors situated in medial quadrants of the breast may reach internal mammary nodes first; and those in lower quadrants may reach celiac lymph nodes. It is known that once cancer cells reach the abdomen, trans-coelomic spread over pelvic organs is possible. [Kruckenburg tumors]

Blood borne spread from breast cancer is mainly to lungs and liver. Osteolytic metastases in bones may occur in cranial bones and in long bones like humerus, leading to pathological fractures. [pictures below]





It is important to stage the tumors for the purpose of treatment and prognosis.

Stage 0 Tumors not yet palpable but discovered by mammography and FNA. These are also called ductal carcinoma in situ. [DCIS]

Stage I Tumors less than 5 cms in size, Confined to breast, not attached to skin or pectoral fascia. [T1, N0, M0]

Stage II Tumors of any size, but attached to skin. Sentinel or axillary lymph nodes involved. [T1,2, N1,M0]

Stage III Tumor of any size but attached to skin and/or pectoral fascia, lymph nodes involved, and fixed. [T1,2,3, N1,2,M0]

Stage IV Presence of distant blood borne metastases. [T1,2,3, N1,2, M+]

Another system used for staging is TNM system, as indicated above.

Clinical staging and histological grading are important for treatment and prognosis. Equally important is histo-chemistry and determining the receptor status of tumors.

Treatment of breast cancer has undergone revolutionary changes. Surgery gives the best chance for cure. The spectrum of surgical procedures has been swinging from disfiguring extensive radical mastectomy to minimal and breast conservative surgery supported by non surgical modalities.

According to standard teaching, early tumors of state 0 and I can be dealt with by segmental resections and breast conservative surgery. Stage II requires removal of tumor and the breast followed by chemotherapy and/or hormone therapy. Stage III and IV are considered advanced tumors. Curative surgery is not possible. Treatment is by chemotherapy and/or hormone therapy. Prophylactic surgery is for de-bulking or to remove fungating lesions.

Neo-adjuvant therapy may downgrade advanced tumors, making curative resections possible. Radiation has a place in management of postoperative recurrences.

Prognosis [five year disease free survival] is excellent in stage 0 and I. Prognosis deteriorates as the stage advances.

There are now known risk factors. They include family history, age of menarche and menopause, oral contraceptives and hormone replacement therapy. Longer fertility period seems to be protective against breast cancer. Thus women with early menarche, late menopause, multiparity, age at first pregnancy, and breast feeding have lower risk for breast cancer. Family history of breast cancer is also a risk factor, since at least 5% of all cases of breast cancer are due to genetic mutations.

Risk factors are also prognostic factors. Accordingly, new pragmatic classification of breast cancer and modalities of its treatment have been suggested.

For ‘Very low risk’ tumors, such as DCIS, and lobular cancer, Local excision is advised.

For ‘Low risk’ tumors’, such as node negative and favorable histology, Loco-regional surgery with/without systemic therapy is advised.

For ‘High risk’ tumors’, such as node positive tumors and those with unfavorable histology, Loco-regional surgery with systemic therapy is advised.

For ‘Locally advanced’ tumors such as large in size or inflammatory cancers, primary systemic therapy is suggested.

For ‘Metastatic tumors’, irrespective of size or nodes, primary systemic therapy is the only option.

Hormone receptor positive tumors may respond to hormone therapy. Tamoxifen is the drug of choice for premenopausal tumors; while aromatase inhibitors are advised for postmenopausal tumors.

Newer biological agents such as Herceptin, is showing promising results. Another new technology is intra-operative local radiation after regional excision of tumor. This is a step in the direction of breast conservative surgery.

Advanced cancers causing lymphatic obstruction in axillary nodes or surgical excision of these nodes may lead to troublesome oedema of the arm called ‘Brawny arm’. Even after surgery, presence of cancer cells in lymphatics may cause recurrences in the form of nodules in the arm, called ‘Cancer-en-cuirasse’. Lymphangiosarcomas are reported in such arms.

Radical breast surgery is cosmetically unacceptable. Hence post radical resection plastic surgery offers many techniques for breast reconstruction.

Alternative to this is the use of external breast implants within the brassieres.

Skin conserving breast resections provide opportunity for inlay type of breast implants made up of silicone. Unfortunately there are unsatisfactory reports where silicon has leaked leading to fresh carcinogenesis.

Ideally management of breast cancer requires a team approach. Such a team should include surgeon, radiologist, pathologist and oncologist.

Breast cancer today is the leading cause of cancer deaths in females, replacing cervical cancer. To reduce this increasing incidence, screening programs for breast cancer have been launched all over the world.

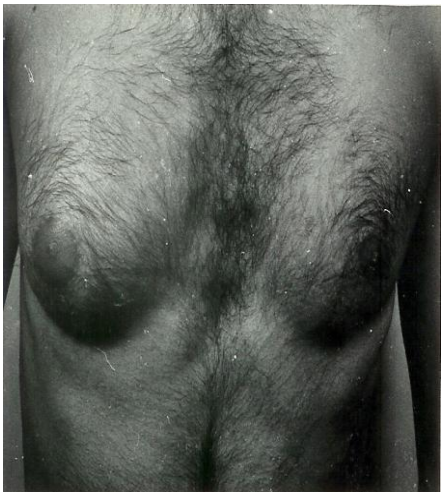
This program is termed 'Triple assessment'. It includes self breast examination, bilateral mammography and fine needle aspiration cytology. This allows early detection of breast cancer, thus improving the prognosis and the chances of cure. Breast cancer awareness programs help in these efforts.

Breasts in Males

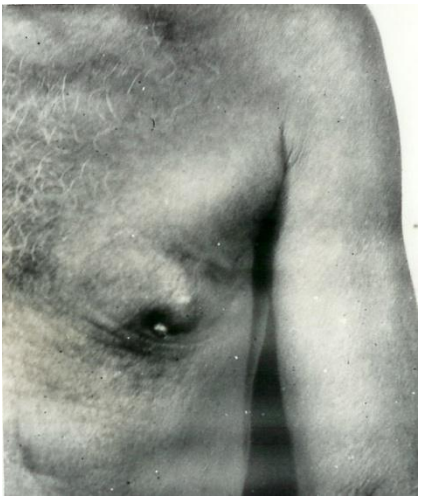
Male breasts resemble their female counterpart except that there are no secretary glands; hence no secretary activity.

In rare cases one or both breasts in young males may enlarge at puberty due to hormonal imbalance a condition called gynaecomastia. If bilateral, systemic causes should be entertained like oestrogen producing testicular tumor, or cirrhotic liver which cannot metabolize the circulating oestrogens. If unilateral, causes may be local in breast, like neoplasm.

Male breasts are not immune to cancer, although they are extremely rare.



Bilateral Gynaecomastia



Unilateral Gynaecomastia

The Chest

Trauma

Since chest accommodates vital organs like lungs and heart, mortality due to chest trauma is very high.

Chest trauma may have three outcomes.

1. Most severe injuries which are instantly fatal, such as rupture of heart and great vessels.
2. Relatively minor injuries which are not fatal unless complications set in. Rib fractures, etc. come in this category.
3. Injuries which are serious but patient can be saved if timely action is taken.

It is this third group where quick diagnosis and treatment is of paramount importance.

Injuries that fall in this group are:

- Airway obstructions
- Pneumothorax, tension or open
- Haemothorax
- Flail chest
- Cardiac tamponade

Principles of management of patients in this group include; A, B, C, of ATLS protocol, basic life support, haemodynamically stabilizing the patient, and essential first aid procedures like splinting and dressings to stop external haemorrhages.

Essential investigations are done while above procedures are in progress.

Moving an unstable patient to other facilities such as radiology for the sake of investigations can be disastrous and even fatal.

Airway Obstructions

Airway obstructions kill by causing asphyxia. Objects blocking the airway could be foreign bodies, blood clots, aspirated vomitus; and in unconscious patients, falling back of the tongue, or even one's own artificial dentures. Observing a cyanotic patient fighting for breath, and using accessory muscles of respiration makes instant diagnosis. Life saving measures include, pulling the tongue out, lifting of jaws and insertion of airway, sucking the contents and cleaning of throat. Bronchoscopy may be required to clean the distal airway.

Cervical spine must always be supported while handling head and neck in trauma cases.

Tension Pneumothorax

This can instantly kill due to ‘Mediastinal shift’, diminished venous return to heart because of kinking of both venacava, and reduced cardiac output.

Injury to lung surface creates valvular tears causing one way air leak from lungs in pleural space with mounting tension. Increasing dyspnoea and cyanosis should alert to the condition. Quick examination of chest can confirm the diagnosis by hyper resonant chest and diminished air entry on the affected side; coupled with shifting of trachea and apex beat to the opposite side. Action must be immediate by inserting a needle in second intercostals space in mid-clavicular line on the affected side. Escape of air relieves the tension and the symptoms instantly.

Chest x-ray should be delayed till tension has been released.

Chest tube insertion with ‘Under water seal drainage’ should then follow.

Open Pneumothorax

Also known as sucking chest wound is due to large open chest wound.

Diagnosis is instant since the air being sucked in and out of pleural space with each breath, makes a hissing sound which is audible from a distance.

Immediately covering the wound with anything that is handy is life saving, till further assistance is available for definitive closure with chest tube drainage.

Haemothorax

Slow leak of blood from intercostal vessels or the lung surface injured by ends of fractured ribs leads to gradually increasing haemothorax. As intra-pleural pressure mounts, respiratory embarrassment sets in along with

evidence of shock.

Diminished movement of the side of chest which is dull on percussion and has reduced air entry suggests haemothorax.

Chest x-ray and needle aspiration can confirm the diagnosis.

Since blood remains fluid due to defibrillating effect of respiratory movements, it can be aspirated or drained by chest tube.

Immediate insertion of chest tube relieves respiratory symptoms.

Occasionally blood clots causing what is called ‘Clotted haemothorax’. Injection of streptokinase in the clot can liquefy the blood which can be drained.

Massive haemothorax is defined as drainage of more than 1000 cc. of blood on chest tube insertion or continued bleeding at the rate of 200 cc. or more per hour. This is an indication for exploration of the chest to control bleeding.

Injuries to great vessels invariably are the cause and can be fatal.

Flail Chest

If many ribs are broken at more than one place on the same side, they create a flap of chest wall which cannot move simultaneously with rest of the chest.

This causes ‘Paradoxical Respiration’, creating to and fro movement of air from one lung to the other, causing carbon dioxide retention, severe anoxia and even cyanosis. By observing exposed chest, findings of broken ribs, depressed chest segment and paradoxical movements are diagnostic.

Normal negative pressure ventilation is not possible in this condition.

Treatment therefore is to immediately start ‘Positive Pressure Ventilation’

with mask or by endo-tracheal intubation if facilities are available.

This helps to elevate the depressed segment. It can also be elevated by clips and traction, and can be fixed by sticking plasters or by surgery.

Cardiac Tamponade

Injury to heart and intra-pericardial vessels results in accumulation of blood in pericardial space, which increases in volume with every heart beat, increases the tension and compresses the heart, progressively reducing the cardiac output.

Condition can be fatal unless pressure on the heart and tension in pericardium is released immediately by pericardial aspiration or catheter drainage, till definitive surgery is performed.

Rupture of Diaphragm

Diaphragm may rupture by blunt trauma or compression injury to the trunk, pushing abdominal contents in chest. Clinical presentation is by severe pain and dyspnoea. Auscultation of chest may reveal gastric splash or bowel sounds. X-ray chest can be confused with pneumothorax. Putting a chest tube can be disastrous.

Insertion of NG tube before x-ray may show its abnormal position in chest. Treatment is surgical. Many cases may remain undiagnosed till late. In such cases infection of partially collapsed lung is the mode of presentation. Chest x-ray and CT scan help in diagnosis.

Oesophageal Rupture

Trumatic rupture of oesophagus can be missed till severe mediastinitis and pleural effusion sets in.

Aspiration of turbid fluid from chest and demonstration of leak by gastrograffin swallow can establish diagnosis.

Drainage of pleural collection and antibiotics are required to control the inflammation.

Minor tear may close with time.

Surgical repair is indicated in severe cases if diagnosed early.

Non Traumatic Chest Conditions of Surgical Interest

Pneumothorax

Spontaneous pneumothorax is due to rupture of bulla or cyst. Tall thin athletic individuals are more prone. Secondary pneumothorax occurs in diseases like tuberculosis and tumors. When the cause cannot be ascertained, it is termed as Primary or 'Idiopathic pneumothorax'.

Presentation is by sudden chest pain. Grades may be minor, moderate or severe, depending on symptoms and the degree of lung collapse, as diagnosed by chest x-ray.

Minor ones can be observed with analgesics to relieve the pain. Moderate and severe ones require chest tube drainage [thoracostomy]. Recurrent ones need thoracoscopy, bullectomy and pleurodesis. Secondary ones and those with broncho-pleural fistula [persisting air leak] require definitive surgery.

Infections of lungs and pleura.

Bacterial or tubercular empyema, lung abscesses, bronchiactesis may require drainage and surgical resections.

Tumors of lungs and pleura

Bronchogenic carcinomas and pleural mesotheliomas require surgical resections for cure.

Apical tumors of lung present in superior mediastinum leading to thoracic inlet syndrome, characterized by vascular obstructions, nerve pressures and Horner's syndrome [Meiosis, Anophthalmos and Anhydrosis].

Radiology, aspiration cytology, endoscopy and biopsy are diagnostic approaches.

Surgical management of non traumatic chest conditions includes drainage, pleurectomy, lobectomy or pneumonectomy.

Mediastinal tumors

Common tumors in superior mediastinum are thymic tumors, lymphomas and retro-sternal goitre.

Tumors of anterior and posterior mediastinum are either developmental enterogenous cysts or neurogenic tumors.

Symptoms are mainly due to pressure on adjacent structures.

Radiology, mediastinoscopy and biopsy help in diagnosis.

Treatment depends on diagnosis.

Surgery is required to relieve the pressure symptoms.

Diaphragmatic hernias can also present as space occupying lesions in posterior mediastinum. They can be dealt with through thoracic approach also.

Oesophageal Tumors

Presentation is with Painless Progressive Dysphagia.

Regurgitation of saliva may lead to aspirations pneumonias which may become the cause of mortality.

Middle third and lower end of oesophagus are the common sites for adenocarcinoma.

Diagnosis is usually late. Barium swallow, CT scan, oesophagoscopy and biopsy are diagnostic modalities.

Resection and reconstruction is indicated for operable tumors.

For inoperable ones, palliative measures include debulking of tumor with laser or electrofulgeration; and stenting to bypass the obstruction.

Mortality of oesophageal cancers is very high.

Achalasia Cardia

This is a motility disorder of lower end of oesophagus which results in dysphagia, more for liquids than for solids.

It requires manometery, radiology and endoscopy for its diagnosis.

Endoscopic dilatation gives satisfactory results. In some cases Heller's Myotomy may be required through abdominal or thoracic route.

Heart and great vessels also belong to chest; however this is highly specialized branch of surgery and beyond the scope of this book.