Autopsy protocol And Procedure OF Autopsy

Dr.Muhammad Hammad

PROTOCOL

Definition:

Dictionary meanings; Official format or original draft of an agreement, in preparation for a treaty.

AUTOPSY PROTOCOL/ POST MORTEM REPORT

Definition:

- It is a signed legal document prepared by Authorized Medical officer containing his observation regarding examination of dead body or clothes presented in court of law for justice.

- It is very specific or important document because of its legal implication so it should be prepared carefully.

Autopsy Procedure

Procedure of Autopsy

- It is done under the following headings in general.
  - External Examination
  - Internal Examination

External & Internal Examination

- External examination includes the examination of the following;
  - Clothes
  - Stains of mud , blood, urine , stools, etc.
  - Identity
  - Body orifices
  - Finger toe-nails
  - Injuries/surgical intervention
  - Rigor mortis
  - Postmortem staining
  - Decomposition /other changes
- Internal examination of three major cavities
  - Skull/Cranium
  - Thorax
  - Abdomen

Procedure of Autopsy

- A. Personal identity of corps
- B. Determination of cause and manner of death.

A. PERSONAL IDENTITY OF CORPS

- The steps include are
- BIODATA

  Record the biodata of deceased which include

  NAME , PARENTAGE, AGE, SEX, OCCUPTION, CAST AND ADDRESS
- This should be verified by two relatives or by friends by recording their names , address, and relation with examinee and NIC name in the appropriate column of register. This is **called third party identification .**
- In case when relatives and friends are not available subjective method of identification are applied i.e. the only choice is to collect morphological data of examinee.

A. PERSONAL IDENTITY OF CORPS

- Personal identity should be noted in fullest possible details e.g .facial features, height, weight, belongings like wrist watch, spectacles and cap.

B. DETERMINATION OF CAUSE AND MANNER OF DEATH

Stages of autopsy

1. Physical examination of clothes and collection of evidence in them
2. Physical examination of body surfaces and collection of any evidence during it
3. Opening of body cavity
4. Scrutiny of internal contents of cavities and vital systems
5. Collection of specimens
6. Closure of the body

A: PHYSICAL EXAMINATION OF CLOTHES

The examination should be done in three steps:

- 1. Inspection of clothes before removal.
- 2. Removal of clothes.
- 3. After removal and detailed scrutiny.

- The removal should be done with great care to avoid any extension in cuts, tears and perforations to avoid any loss of evidence on them.
- If removal of clothes is difficult due to certain reasons these clothes should be cut on seams a note of it should be made on autopsy report.

A: PHYSICAL EXAMINATION OF CLOTHES

- The main objectives of examination of clothes is to collect material evidence on them.
  - 1. Name of clothes i.e. shirts, trouser, shalwar
  - 2. No of clothes
  - 3. Colour of clothes
  - 4. Whether dirty or clean
  - 5.loosened, zipped
  - 6. Any damage on clothes whether torn or not,
    - Whether there are cuts or holes on them
    - Whether these corresponds in size and site to body injuries.
    - **If cuts wholes and tears are present, encircle and sign them.**

A: PHYSICAL EXAMINATION OF CLOTHES

- 7. Whether they are blood stained, soaked and smeared.
- 8. Any other stain other then blood i.e vomitus , feces , semen or grease, If present these should be preserved. If clothes and stains are wet these should be air dried
- 9. Note any tyre marks
- 10. Any foreign material like broken glass pieces, hair, shot charges when present are collected in separate container and sealed and handed over to police as case property.

- After examining these clothes should be signed and handed over to police officials after getting their signatures on autopsy register. Sometimes the clothes have already been removed by initial medicolegal examiner; this fact should be noted in report.

B : PHYSICAL EXAMINATION OF BODY SURFACES
OR
EXTERNAL EXAMINATION

- There should be through examination /inspection of body by **naked eye** as well as by **magnifying lens**,
- <u>The body is inspected from head to toe for following:</u>
  - 1. Any abnormality of skin due to postmortem change
  - 2. Colour and distribution of scalp hair.
  - 3. Whether examinee well built or weak built
  - 4. Colour changes on face whether pale or congested.

B: PHYSICAL EXAMINATION OF BODY SURFACES OR EXTERNAL EXAMINATION

- 6. Mouth. whether open or close , presence of froth or any other foreign material
- 7. Length and weight of body
- 8.circumference of head and crown heel length should also be noted in case of autopsy on infants body.
- **9.The physical changes** that occur in the dead body after death like,
  - stages of hypostasis or postmortem lividity
  - Rigor mortis----Extent of development
  - Putrefaction------stage of decomposition
- 10.Evidence of medical and surgical treatment.
- 11.Injuries on body.
- 12.Special evidence of forensic importance such as cadaveric spasm, hesitation cuts and defense wounds.
- 13.Examination of body orifices / opening, look for injury, foreign body.

- It is prudent to get the whole body X-rayed in case of multiple fractures, Bomb blast, Suspected infanticide and death due to criminal violence or by the advanced stage of putrefaction.
- After inspection body is palpated to locate any foreign body like bullet under the skin.

C. Opening of body cavities

Autopsy dissection Techniques

- R.Virchow's Technique.
- C.Rokitansky's Technique
- M.Letulle's Technique
- A.Ghon's Technique
- Evisceration

R.Virchow's Technique.

- In this method organs are removed one by one.
- First the cranial cavity is exposed & from the back , the spinal cord, followed by the thoracic , cervical and abdominal organs.
- This method is used most widely.
- Advantage → That each organ can be studied in detail. However the anatomicopathologic relationships of organs are not preserved thus can not be studied.

C.Rokitansky's Technique

- This technique involves in situ diseection in part combined with en block removal.
- This technique is commonly preffered whenever the pathologist wants to limit the spread of infection such as HIV, Hepatitis B etc.
- The disadvantage of this method is that the organs can not be studied in detail.

M.Letulle's Technique

- In this method thoracic, cervical, abdominal & pelvic organs are removed enmass but subsequently dissected as organ block.
- This technique is best technique for routine inspection preservation of connections between organ & organ systems.
- The organ blocks can then be studied in detail.

A.Ghon's Technique

- In this method the thoracic, cervical, abdominal organs and the uro genital system are removed as organ blocks.

Evisceration

- The method is removing thoracic & abdominal organ blocks prior to dissection or removing each organ in sequence.
- The pathologists are most comfortable.
- Many crucial observations made only during evisceration.
- All the organs should be weighed and a brief description of the organs should be recorded.

NORMAL WEIGHT OF HUMAN ORGANS IN GRAMS

- Brain 1300
- Heart 300
- kidney 150
- Liver 1500
- lungs 550/450
- uterus 50/100
- ovary 10
- prostate 20
- Pancreas 100
- pituitary 0.7
- spinal cord 25
- spleen 150

OPENING OF BODY CAVITIES
OR
INTERNAL EXAMINATION

- The cranium, thorax and abdomen are opened without damaging the internal contents. In two stages
- 1. The choice that which cavity is to be opened first depends upon the type of case.
- 2.Spinal cord is not usually opened.

Table 14.2: Type of case and the body cavity preferred to open first

Indication/Type of Case		Cavity
Head Injuries	:	Cranium
Hanging, Strangulation	}	Cranium
Throttling	}	
All other cases	:	Thorax & Abdomen

I. PRIMARY AUTOPSY INCISIONS (ON SKIN)

- **FOR SCALP**

  (MASTOID TO MASTOID INCISION)

- **FOR TRUNK**
  - I shaped
  - Y shaped
  - Modified Y shaped

ii. SECONDARY AUTOPSY INCISIONS

- **CUTTING OF BONES** -- (to expose the cavities)

- **Sawing of skull** -- **(for cranial cavity)**
- **Cutting of sternal plate** -- **(for thoracic cavity)**

iii. TERTIARY AUTOPSY INCISION

ON SEROUS MEMBRANES.

- Cutting of meninges
- Cutting of pleura
- Cutting of peritonium

iv. QUATERNARY AUTOPSY INCISION

ON VISCERAE

- To expose the chambers of heart.
- To expose the inner of lungs.
- To expose the inner of liver.

THE ABDOMEN AND THORAX

- The abdomen and thorax are opened together for which the body is placed supine with a wooden block under shoulders to extend the neck.
- Three types of primary incisions are applied;
  - STRAIGHT INCISION (I-SHAPED)
  - Y SHAPED INCISION
  - MODIFIED Y SHAPED INCISION

Primary incisions

- **STRAIGHT INCISION I SHAPED** This extends from the chin to pubic symphysis and is applied in the mid line avoiding umbilicus and injury in its way.
- It is routinely used in practice.
- Advantage:
  - it is simple & convenient.

Primary incisions

- **Y SHAPED INCISION**
- This extend obliquely downward from the point 2-3 cm behind the lobe of ear running forward to meet at the upper border of Manubrium sterni or suprasternal notch.
- A vertical incision being made in the course of straight incision.
- Advantage:

  This is preferred when the detailed study of neck structures is required e.g. in case of asphyxial death due to interference at the level of neck

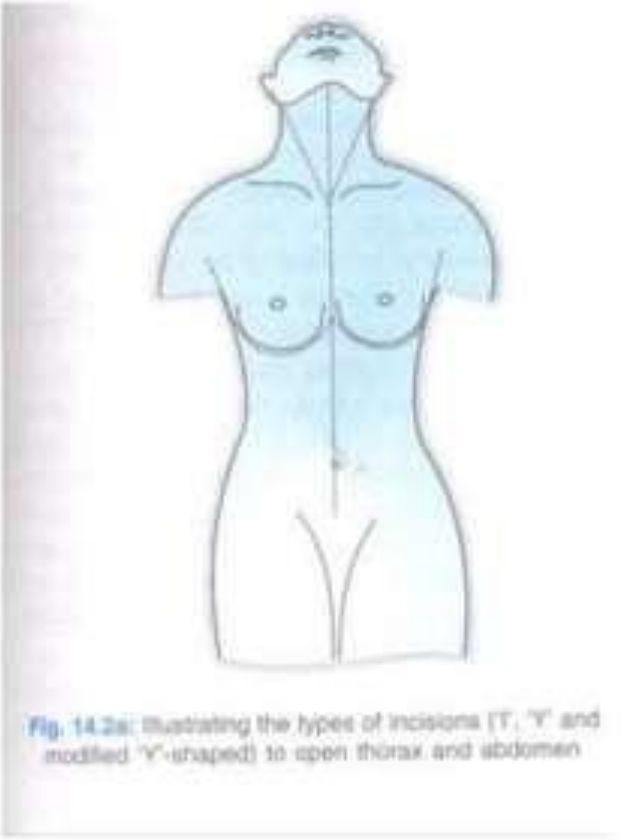
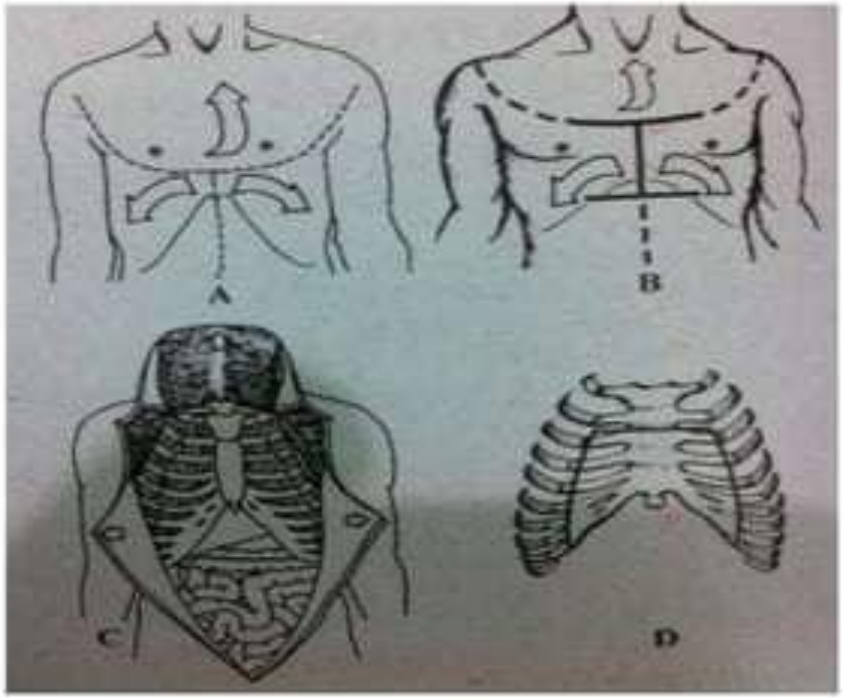


Fig. 14.2a: Illustrating the types of incisions ('I', 'Y' and modified 'Y'-shaped) to open thorax and abdomen

Primary incisions

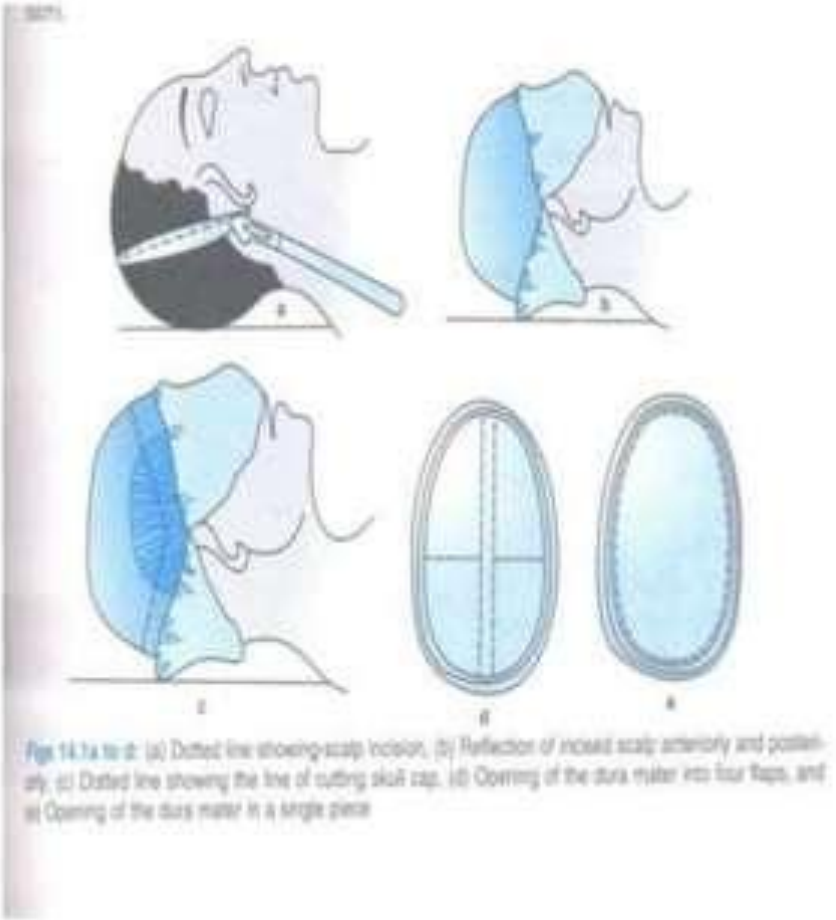
MODIFIED Y SHAPED INCISION

- This begins at a point near the acromial end of each clavicle and extends in a curve either above the nipple or below the breast on each side to meet at the xiphoid process of sternum depending upon whether deceased is male or female.
- From this point incision extends downward in the midline to the pubic symphysis following the course of straight incision. .
- These primary incisions should extend through skin, soft



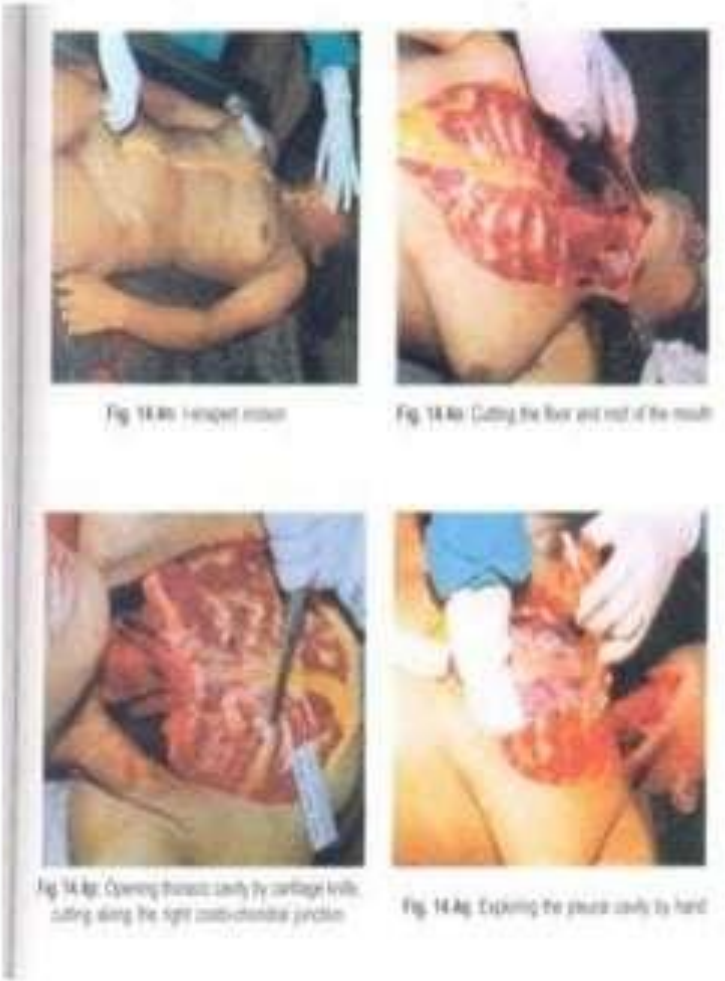
Primary incisions

- **SCALP INCISION (MASTOID TO MASTOID INCISION**
- Incise scalp in coronal plane extending from one mastoid to the other over the vertex.
- This incision is carried through entire thickness of scalp but not through temporal muscle.



OPENING OF STRUCTURES OF NECK

- These are exposed by further elevation of skin sub cut tissues as far as the area of mandibles
- In suspected interference at the level of neck layer wise dissection of neck muscles should be done and details are noted regarding,
- 1: Any injury to the muscles, thyroid gland, larynx, trachea, hyoid bone and blood vessels of neck.
- 2: Details about any pathological lesion if present should be noted.
- 3: Then tongue is removed and details are noted.

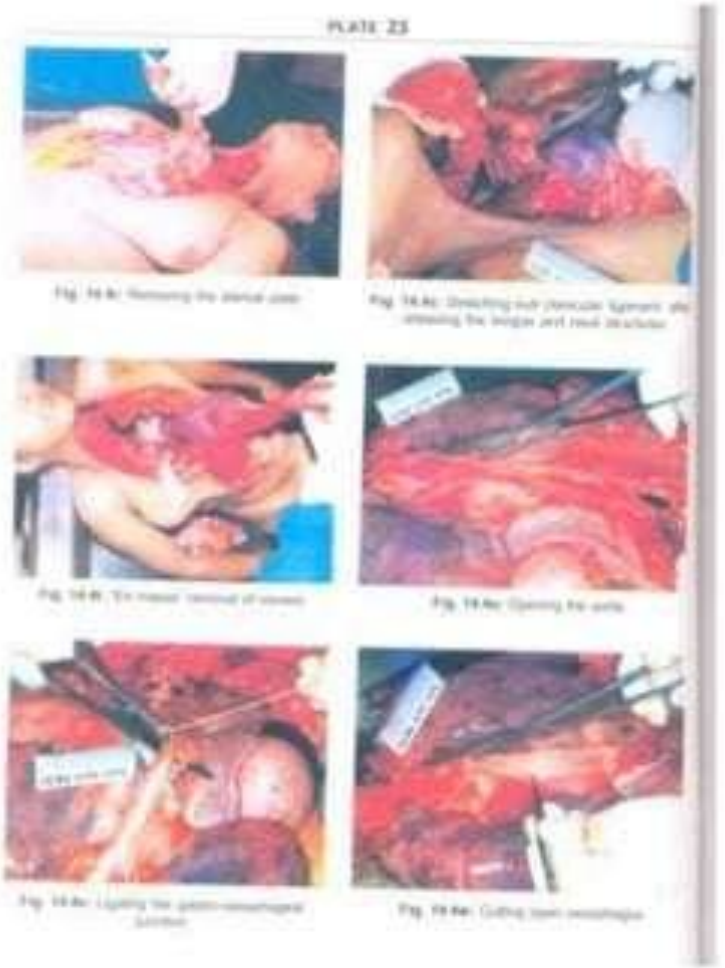


OPENING OF THORAX AND ABDOMEN

- 1. Reflect the skin along with muscles from chest cage.
- 2. Cut costal cartilages just medial to costochondral junction by a large heavy cartilage knife. This will open the chest cavity.
- 3.If cartilage is calcified rib shear is used to cut these.
- 4.The knife should be placed parallel with the surface of body so that the point may not enter the cavity and damage the lungs
- 5.The capsular ligament is cut to disarticulate sterno clavicular joint
- 6.The first rib is then severed with rib shear

OPENING OF THORAX AND ABDOMEN

- 7. Dissect the diaphragm starting from one side, free it from last rib and remove the triangular piece of chest wall to expose heart ,superior mediastinum and pleural cavity
- 8. The characteristic of tissues in anterior mediastinum and size and consistency of lymph nodes is noted



TESTING OF PNEUMOTHORAX

- Before opening the chest presence or absence of pneumothorax is noted and tested.
- By making a pocket containing water in the side of chest after cutting skin, muscles away from rib cage.
- An intercostal graduated glass cylinder is held over the pocket containing water in the side of chest.
- The intercostal space is stabbed with scalpel below the water level to permit the escape of air in cylinder.
- It will show gas bubbles replacing water in cylinder.

OPENING OF THORAX AND ABDOMEN

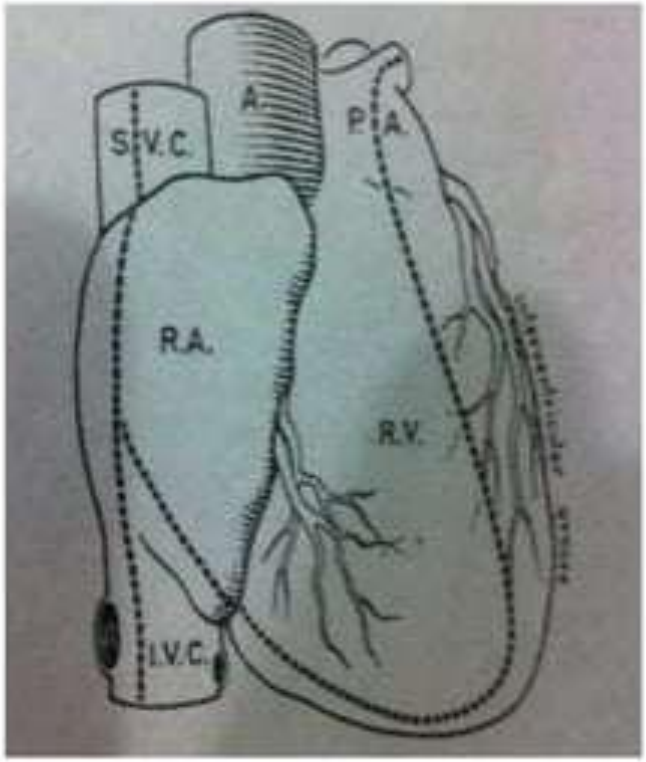
- Similar procedure is repeated by making a pocket in the side of pericardium before opening heart.
- The peritoneum is incised carefully by using two fingers of hands as director to avoid injury to intestine and other viscerae.

SECRUTINY OF INTERNAL CONTENTS OF CAVITIES

- Inspect the pleural & peritoneal cavities for presence of any fluid ,adhesion formation ,any collection of pus, for any disease, any injury or rent in any organ and amount of haemorrhage in cavity is noted.

OPENING OF HEART

- The pericardial cavity should carefully be opened and note is made for ,
- Amount of fluid. condition of surfaces, presence of adhesions, any collection of pus and blood.
- The heart may be removed unopened or right side may be opened before removal.
- Cut is made in Rt atrium continued through tricuspid valve on inferior part of Rt ventricle, then through anterior wall Rt ventricle close to septum and in to the pulmonary artery.
- Contents of atrium, ventricles and pulmonary artery are scrutinized for any thrombus as in case of death due to pulmonary embolism

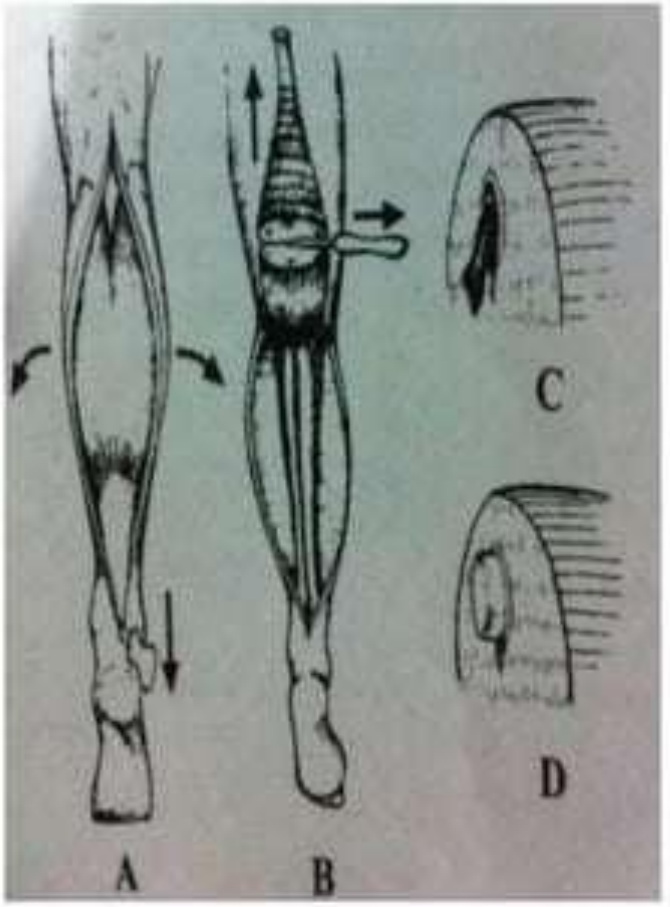


Pulmonary embolism

- Pulmonary embolism may be detected by opening pulmonary artery before opening of any other part of heart.
- The embolus must be differentiated from postmortem clot.
- EMBOLUS: Is firm and has transverse ridges coiled itself and is generally of the size of femoral vein.
- POST MORTEM CLOT: It forms after death in stagnant blood. The postmortem clot are soft, smooth, shiny and purple and yellow. When yellowish in colour it is called chicken fat clot.

Pulmonary embolism

- The confirmation of origin of such thrombi from deep veins of the leg can be confirmed by exploring the calf muscles , transversely incising the belly and noticing a firm structured thrombi popping out as sausages from the transected vein.
- Post mortem clot being flabby does not pop out and instead bends under the influence of



PERITONEAL CAVITY

- The peritoneal cavity and abdominal organs are inspected for
  1. Amount of blood and fluid
  2. characteristic of surfaces and presence of adhesions
  3. Relative position of viscera should be recorded
  4. Any disease of these organs
- TWO TECHNIQUES ARE AVAILABLE TO REMOVE VISCERA FROM CAVITY
- 1. Organ by organ technique
- 2. Evisceration

CRANIAL CAVITY

- Dissection of cranial cavity includes following steps
  - 1.Scalp incision
  - 2.Removing of skull cap/ calveria
  - 3.Opening of dura matter
  - 4.Removing of brain
  - 5.Dissecting the brain and its parts

- Before starting incision ,examine the scalp properly for any injury /disease process.
- During each step of dissection proper examination of
  - Scalp---------for injury
  - Skull----------for any fracture.
  - Membranes-----for hemorrhage or pus
  - Brain----------for pressure effect, injuries ,
  - congenital anomalies, abscess, tumors, be done
- Keep a wooden block under the shoulder making head rest firmly.

SCALP INCISION (MASTOID TO MASTOID INCISION

- Incise scalp in coronal plane extending from one mastoid to the other over the vertex.
- This incision is carried through entire thickness of scalp but not through temporal muscle.
- The scalp is reflected both anteriorly and posteriorly. Examine the outer surface of scalp as well as inner surface of scalp after reflection for any injury or any other findings.
- The reflection anteriorly should be carried to a point 1.5 cm. above the supra orbital ridge.

REMOVAL OF SKULL CAP

- 1.Incise temporalis muscle at its origin and reflect it down on both sides .
- 2.Saw the skull bone a little above supracilliary ridges in front and occipital protuberance behind.
- 3.Now let both lines meet at an angels of 100-120 degree above the mastoid process.
- Remove the skull cap exposing dura matter.

OPENING OF DURA

- A: one flap method,
- Cut the dura along saw cut in bone by a scissor.

- B: Four flap method,
- 1.By a sharp pair of scissor cut on either side of midline.
- 2.On each side extend it by cutting it parallel to mid line antero posteriorly.
- 3.Then cut along coronal plan on either side.
- 4.The dura matter is reflected in to four flaps.
- 5.Examine brain still intact and note down your observation.

REMOVING OF BRAIN

- Insert four fingers of left hand between frontal lobes and skull.
- Draw the lobe backward ,gently cut optic nerve and then other nerves and vessels with right hand.
- Cut tentorium cerebelli along superior border of petrous bone and along its attachment in posterior cranial fossa.
- Cut spinal cord ,first cervical nerve. as low as possible through foramen magnum.
- Support the brain in left hand and remove with cerebellum.