

***SURGICAL INCISIONS IN
CARDIO-THORACIC SURGERY***

Thoracotomy

- ❖ Thoracotomy is an Incision into the thoracic cavity to gain access to lungs, pleura heart or oesophagus.(surgical opening of the chest cavity)
- The position of the incision relative to the thorax may be
 - lateral (Postero–lateral , antero–lateral) or
 - anterior (transverse, vertical).
- ❖ The optimal approach to the thorax depends on a no. of variables ;
 - I. Bony anatomy
 - II. Location & extent of pathology
 - III. Location of the hilum
 - IV. Objectives of the procedure

❖ **Common surgeries on lungs & pleura -**

- Pneumonectomy
- Lobectomy
- Segmental resection
- Wedge resection
- Lung volume reduction surgery (LVRS)
- Pleurectomy
- decortication

❖ **Common surgeries on oesophagus -**

- Oesophageal resection
- Repair of oesophageal perforations

❖ Common surgeries on heart –

- Valve repair or replacement
 - Coronary artery bypass grafting
 - Grafting or repair of coarctation of the aorta
 - Closure of atrial or ventricular septal defect
 - Correction of Tetralogy of fallot
 - Heart transplantation
 - Pacemaker insertion
 - Ligaturing of patten ducutus arteirosus
 - Pericardiactomy
- 

❖ **INCISIONS:–**

- I. Posterolateral Thoracotomy
 - II. Axillary Thoracotomy (Muscle Sparing)
 - III. Anterior Thoracotomy (median sternotomy, clamshell sternotomy, hemiclamshell thoracotomy)
 - IV. Anterior Cervicothoracic Approach
 - V. Transclavicular Approach
 - VI. Thoracoabdominal Incision
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❖ Postero – lateral thoracotomy

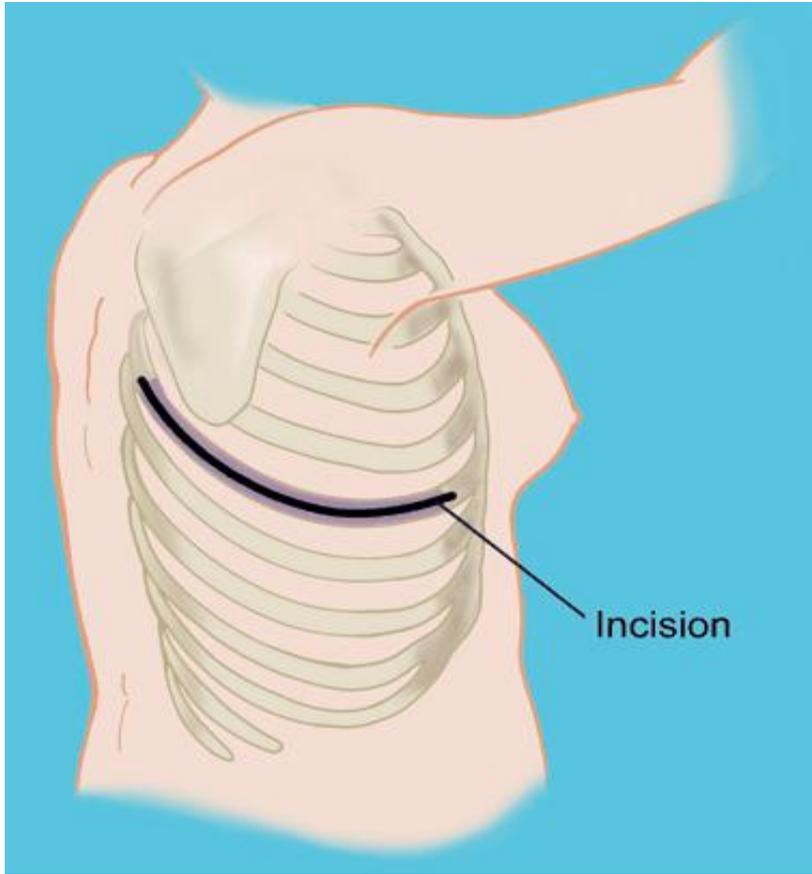


- **Commonly used** – for operation on lungs
 - used for open heart surgery ¹.
- **INCISION** –
 - Curved incision
 - Start at the level of the 3rd thoracic vertebrae & follow the vertebral border of scapula & the line of the rib extending forward to the ant. Angle of costal margin
- **Muscles cut** – Lower fibers of Trapezius
 - latissimus dorsi
 - rhomboids
 - serratus anterior
 - intercostals
- For pneumonectomy or lobectomy – Incision through the bed of 5th or 6th rib.
- To approach diaphragmatic pathology – Incision through 7th or 8th intercostal space .

- ▶ Finnochietto – type retractor are used
 - ▶ For smaller incision smaller retractor are used
 - ▶ A single modified thoracotomy tube usually provide adequate drainage
 - ▶ Additional drainage holes are cut in the tube and it is tunneled transversely so as to lie in the diaphragmatic sulcus and course post. To the apex of the chest ; thus it function as both a basilar and an apical tube.
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1) Right postero–lateral thoracotomy for open heart surgery in infants and children.

hayel L , Petit J , Planche C, Roussin R , Lacour G.



❖ Axillary thoracotomy :-

- **Commonly Used for**
 - Lung transplantation
 - Repeat thoracotomies
 - congenital heart disease²..
- several advantages ;
 - I. Major thoracic muscle are left intact
 - II. Increased both opening & closing of the chest
 - III. Cosmesis is improve
- Disadvantages ; if incision is made small , it is difficult for the surgeon to have adequate simultaneous visibility.
- **Position of patient** - lateral decubitus
 - elbow is rotated cephalic on up to the axilla
 - body is rotated post. So that more of the anterior and lateral chest is exposed

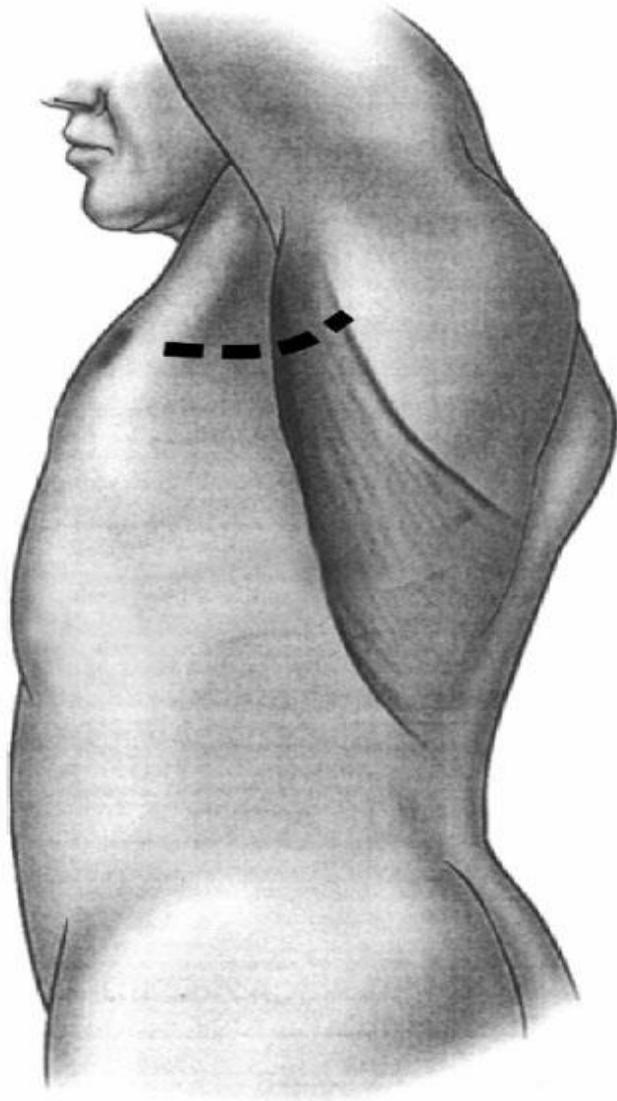
➤ **INSICION:–**

- skin incision may be vertical or oblique.
- Vertical incision – for open procedure
- Oblique incision – for Video Assisting Thoracic Surgery (VATS)
- ▶ 5 to 7 cm incision – along the ant. Axillary line. Usually on the nipple in male patient or 4th intercostal space.
- ▶ Structures cut – skin
 - subcutaneous tissue
 - intercostals
 - serratus anterior

2) Surgery for Congenital Heart Disease

Right axillary incision: A cosmetically superior approach to repair a wide range of congenital cardiac defects

René Prêtre, MD^{a,*}, Alexander Kadner, MD^a, Hitendu Dave, *Thorac Cardiovasc Surg* 2005; 130:277–281





Postoperative result of the skin incision used in conjunction with a groin incision for the correction of an abnormal return of the right upper pulmonary veins.

❖ **Anterior Thoracotomy :-**

- With recent trends towards minimally invasive cardiac surgery , the ant. Thoracotomy is regained popularity.
- The accepted, standard, approach for emergency thoracotomy is via the left anterior fourth intercostal space.
- This incision allows good access to the cardiac ventricles, main pulmonary artery, left hilum and the left lung.

- I. Vertical (Median sternotomy)
- II. Transverse (submammary)
(Bilateral thoracosternotomy)
(Clamshell)
- III. Thoraocosternotomy (Hemiclamshell)

I. **Median sternotomy (Vertical) :-**

- Commonly used anterior incision
- **Commonly used for** – cardiac surgery
– general thoracic surgery
operation to
access
both pleura & mediastinum.
- **Patients position** – Supine, a roll is placed under the
sternum so that
sternal notch is exposed.
- **INCISIONS :-**
 - The incision extends from just above the suprasternal notch to a point about 3cm below the xiphisternum
 - Midline of the sternum is marked & knife divides the skin.
 - Sternum is divided longitudinally and retracted.

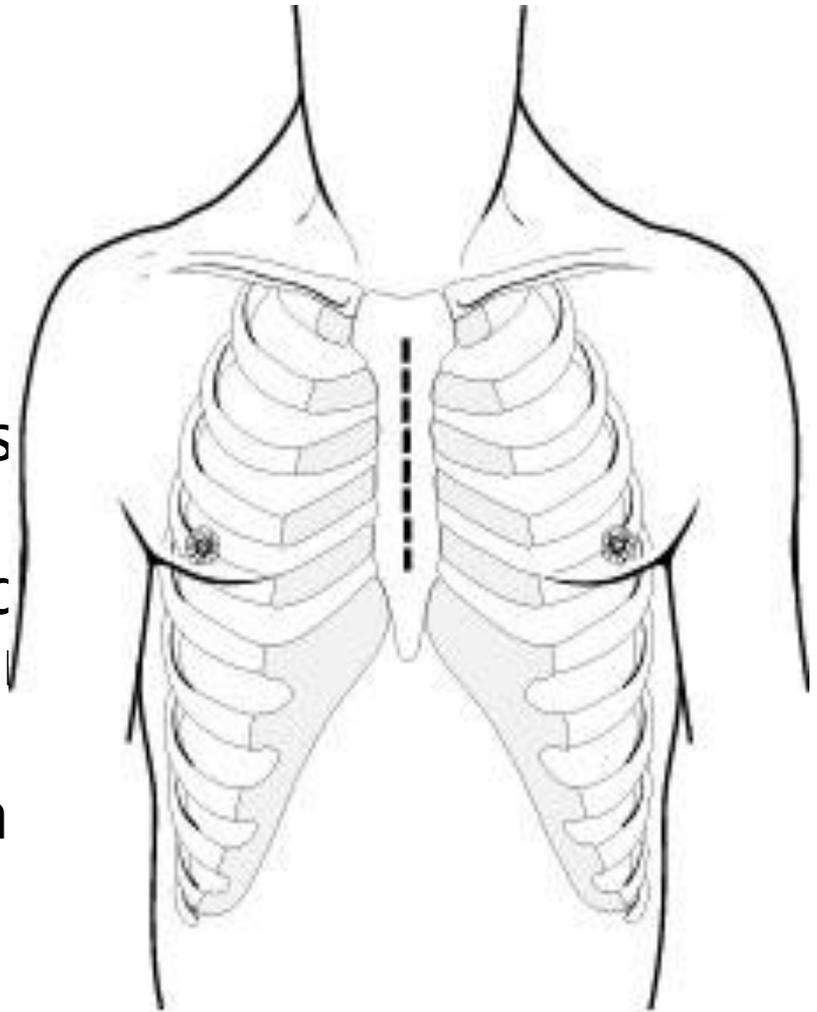
Structures cut – skin

- subcutaneous tissues

Interweaving aponeuroses of pectorals

major

- Here no muscle are divided – action of pectoralis major is affected.
- So that care must be taken when patient is moved.
- The commonest postural fault with this incision is shoulder girdle protraction.



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- Disadvantages of median sternotomy are:-
 - it requires an implement to cut bone (bone cutter)
 - access to the descending aorta is difficult & access to posterior chest wall vessels is poor
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II. Transverse (Submammary)(Bilateral thoraco – sternotomy) (clamshell) :-

- Usually not used
- To allow access to the right atrium, aorta, right hilum and lung.
- **Commonly used for – bilat. Lung transplantation**
 - bilat. Pul. Metastasis
 - large tumour on ant. mediastinum.
 - some cardiac surgeries³.
 - operation on thoracic outlet⁴.
- **INCISIONS :-**
 - A transverse incision is made through the 4th intercostal space extending from ant. Axillary line along the inframammary crease to other ant. Axillary line.

➤ **Structure cut – skin**

- Subcutaneous tissue
 - pectoralis major
 - Intercostals
 - Sternum (transversely)
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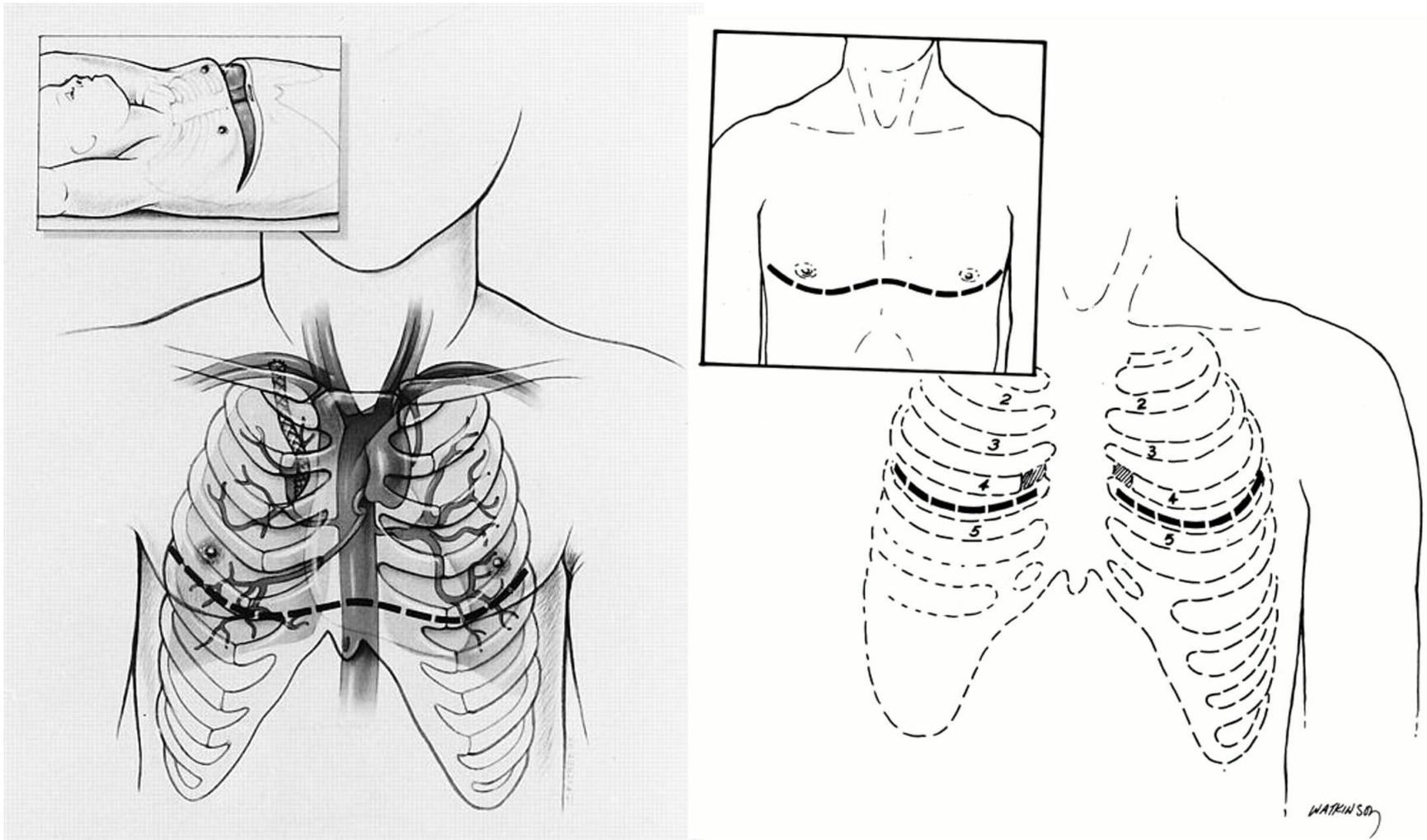
3) **Complete Repair of VSD With Diminutive or Discontinuous Pulmonary Arteries by Transverse Thoracosternotomy**

Anton Moritz, MD, Manfred Marx, MD, Gregor Wollenek,
Departments of Cardiothoracic Surgery, and Pediatric Cardiology,
University of Vienna, Vienna, Austria.. October 5, 1995.

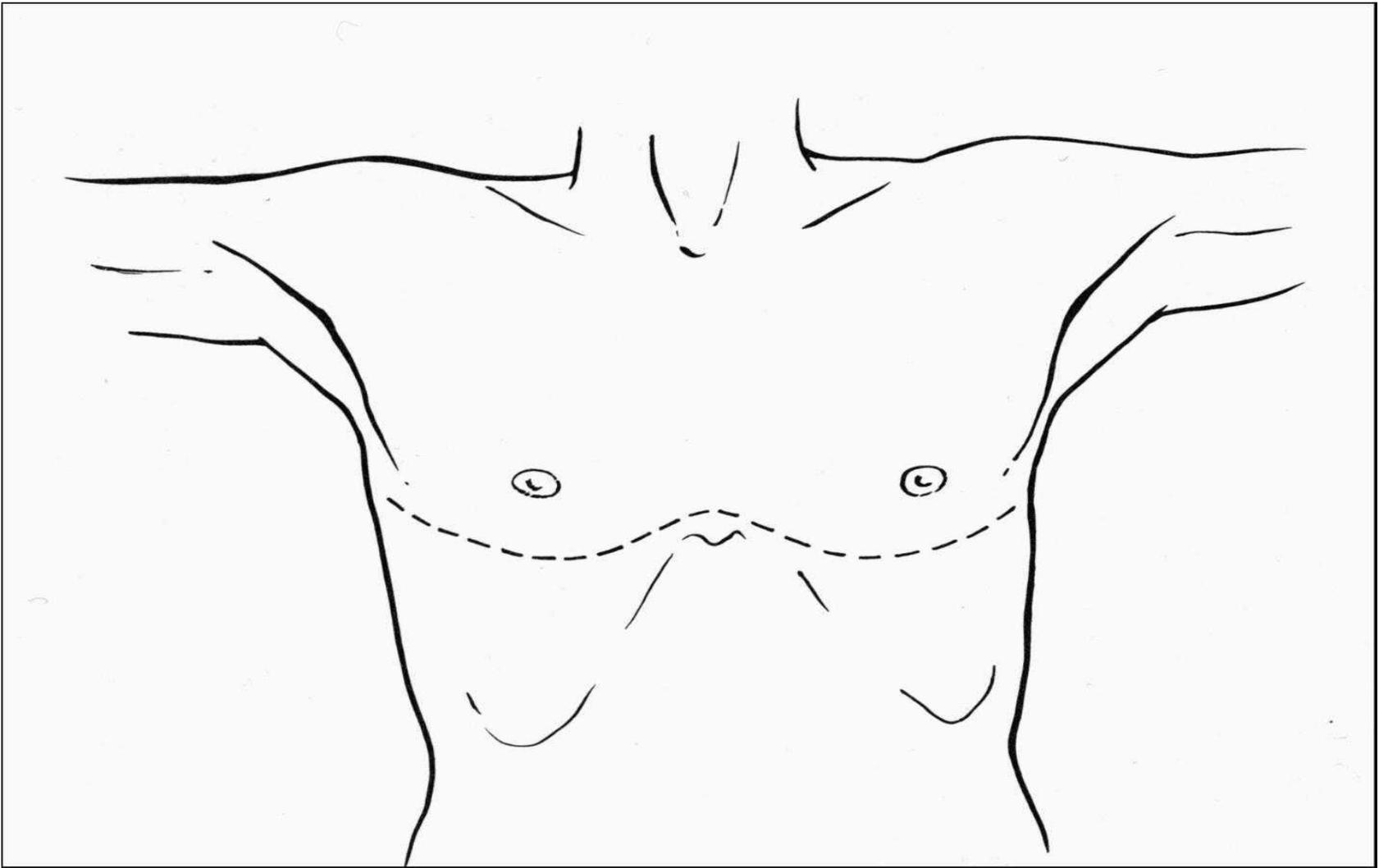
4) **Single-stage repair of extensive thoracic aortic aneurysms: Experience with the arch-first technique and bilateral anterior thoracotomy**

Read at the Eighty-fourth Annual Meeting of The American Association
for Thoracic Surgery, Toronto, Ontario, Canada, April 25–28, 2004.

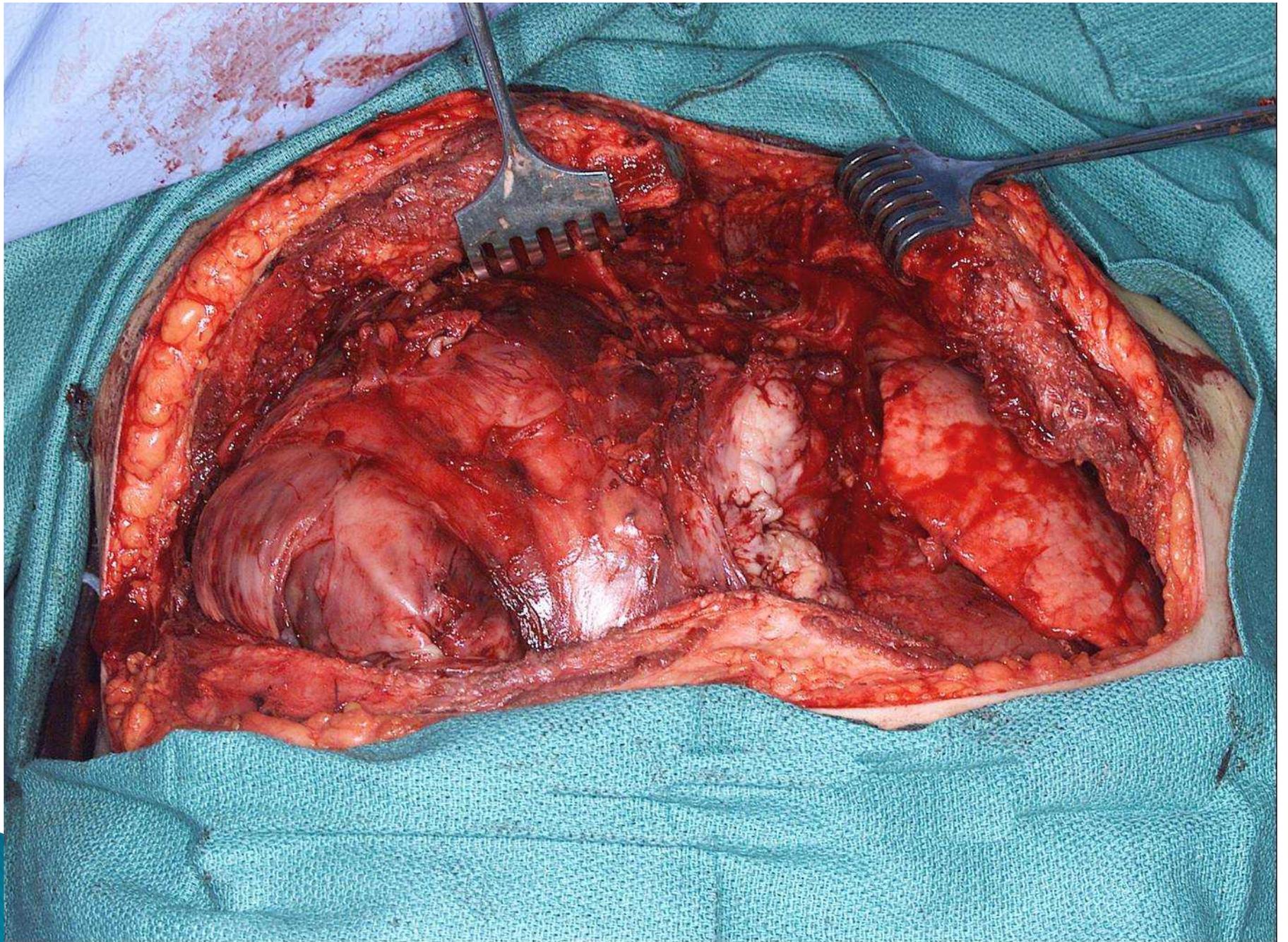
____Nicholaus T, Kouchoukos M.D., Micheal C Money ,Paolo Maseti.



Moritz A. et al.; Ann Thorac Surg 1996;61:646-650



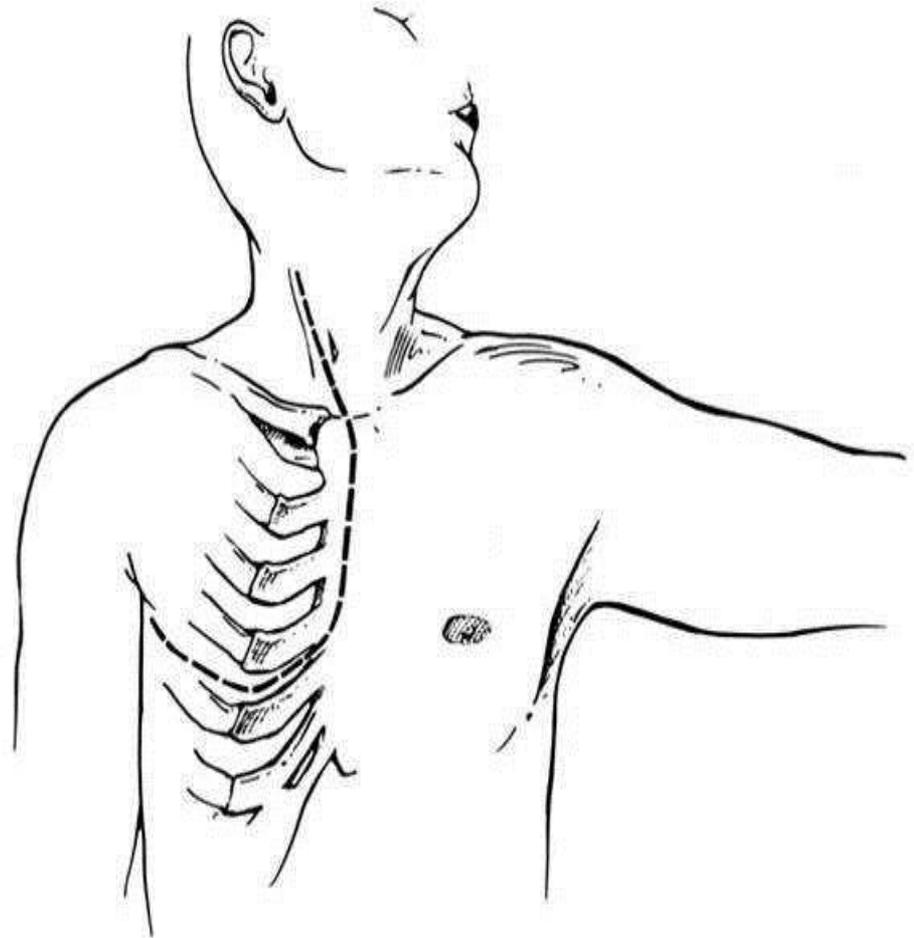
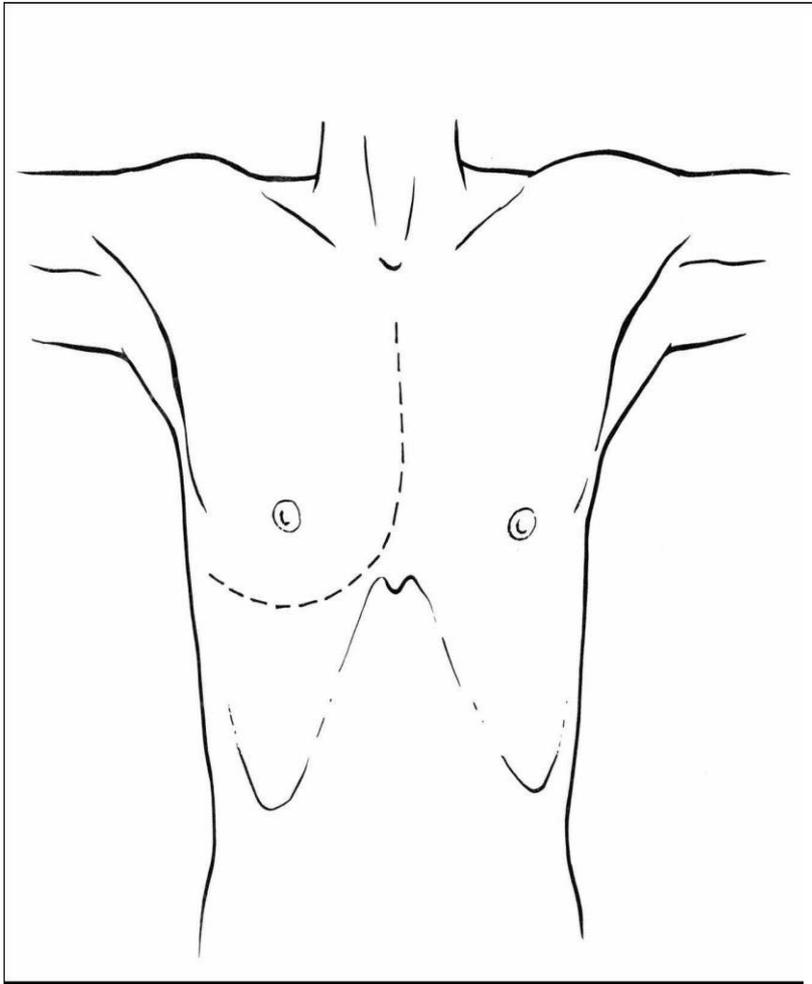
Showing clamshell incision (Bains MS et al. The clamshell incision: an improved approach to bilateral pulmonary and mediastinal tumor. *Ann Thorac Surg* 1994;58:30-33. Used with permission)



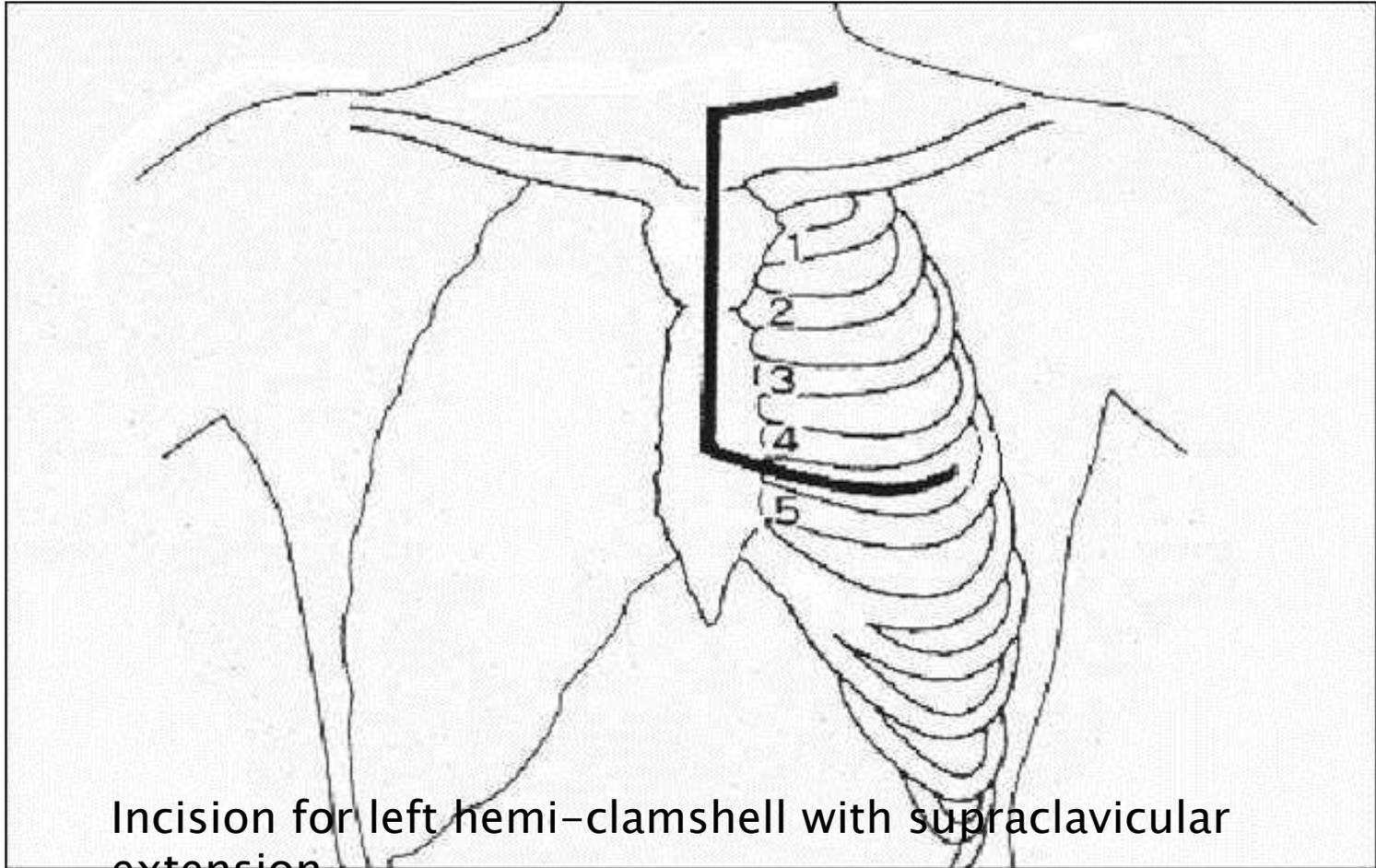
III. Thorocosternotomy (Hemiclamshell):-

- commonly used for – large special pulmonary lesions.
- **Position of patient** – supine or with small support elevating chest, both arm may be tucked.
- **INCISIONS** –
 - The initial skin incision is inframammary incision & opening of the 4th intercostals space.
 - The skin incision is then extended over the sternum and up towards the sternal notch decussating the fibers of pectorals major muscle & then along the 4th intercostals space.

- **Structures cut** – Skin
 - Subcutaneous tissue
 - pectoralis major
 - Intercostals



Incision for a right hemi-clamshell (Bains MS et al. The clamshell incision: an improved approach to bilateral pulmonary and mediastinal tumor. Ann Thorac Surg 1994;58:30-33. Used with permission)



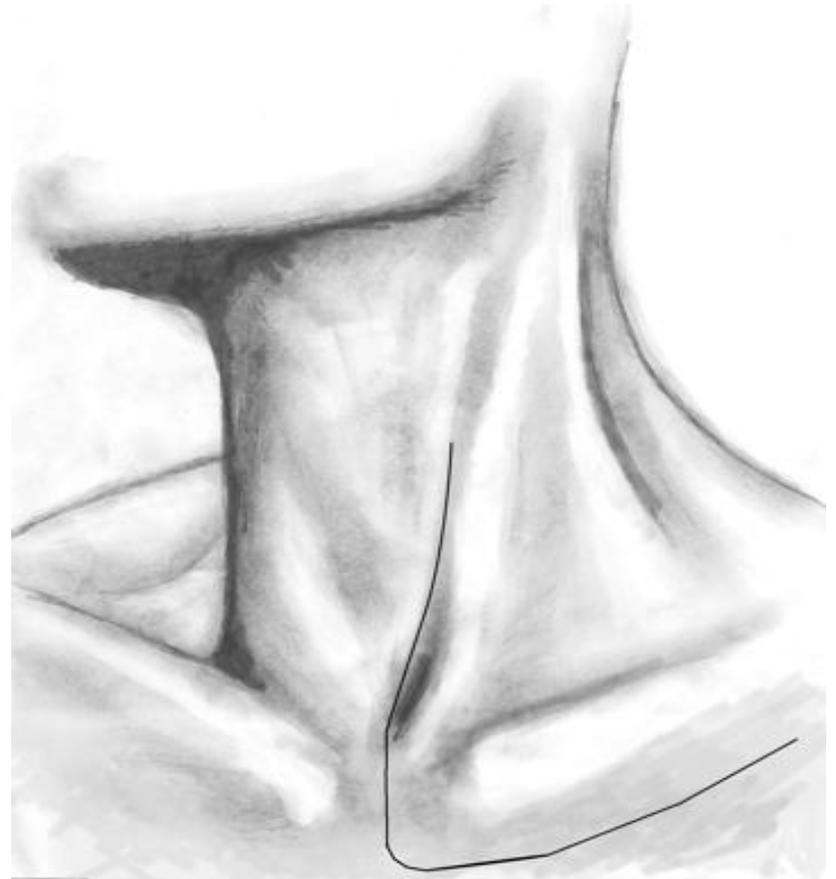
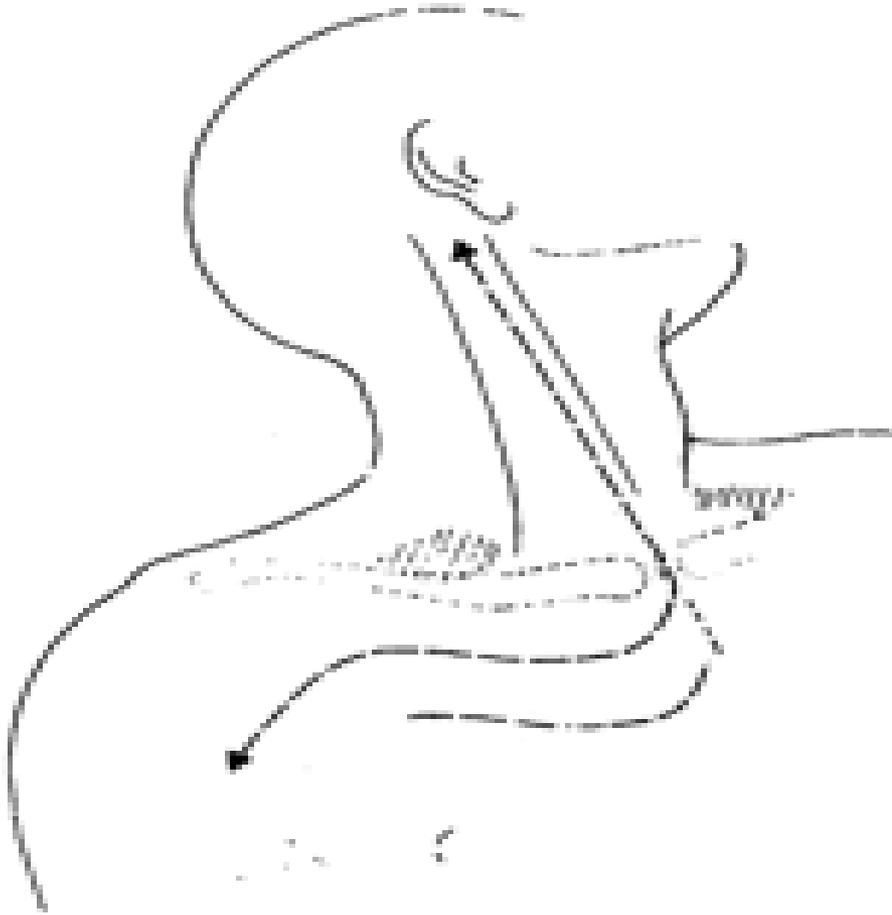
Incision for left hemi-clamshell with supraclavicular extension

❖ **Anterior cervico–thoracic approach :-**

- **Commonly used for–** pathology at the level of thoracic outlet
 - Apical intrathoracic pathology
- **Position of patient** – supine, soft support under shoulder , the head is turned away from side of pathology.
- **Incisions** – An ‘L’ shaped skin incision is made along the anterior border of the ipsilateral S.C.M. muscle to the sternal notch & then curving out below the clavicle going towards deltopectoral groove.
- Depending upon the pathology – manubrium is divided, cut carried out at the 1st or 2nd intercotal space.
 - clavicle is either divided or exceeded.

–

'L' shaped skin incision for ant. approach

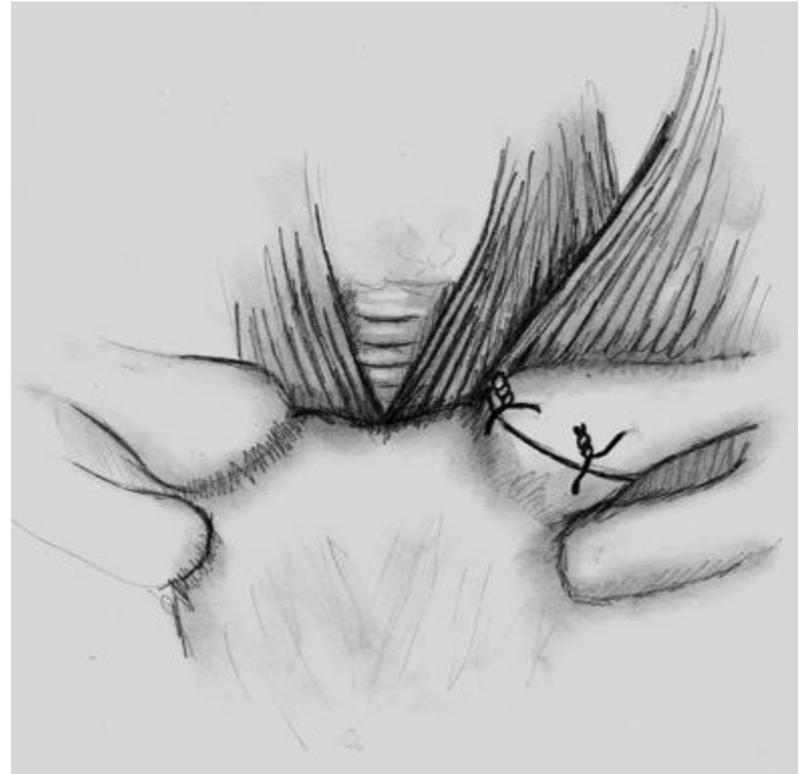


❖ **TRANSCLAVICULAR APPROACH :-**

- **Commonly used** – if the pathology requires resection of apical chest wall & exposure of brachiocephalic vessels and brachial plexus.
Tumor at thoracic outlet⁵.
- **INCISIONS :-**
 - Again 'L' shaped skin incision is used .
 - Medial attachment of this muscle to the head of the clavicle and sternum are divided.
 - Dividing or excising the medial portion of clavicle allows for easy access to the first rib.
 - After dividing the head of the clavicle, hemisternal retractor is used to elevate the clavicle
 - Depending on the extent of disease chest wall may be divided

5) Anterior transclavicular approach to malignant tumors of the thoracic inlet: Importance of the scapulothoracic articulation
Marc de Perrot, MD^{a,*}, Raja Rampersaud, MD^b

Location of osteotomy for transclavicular approach



❖ THORACOABDOMINAL INCISIONS

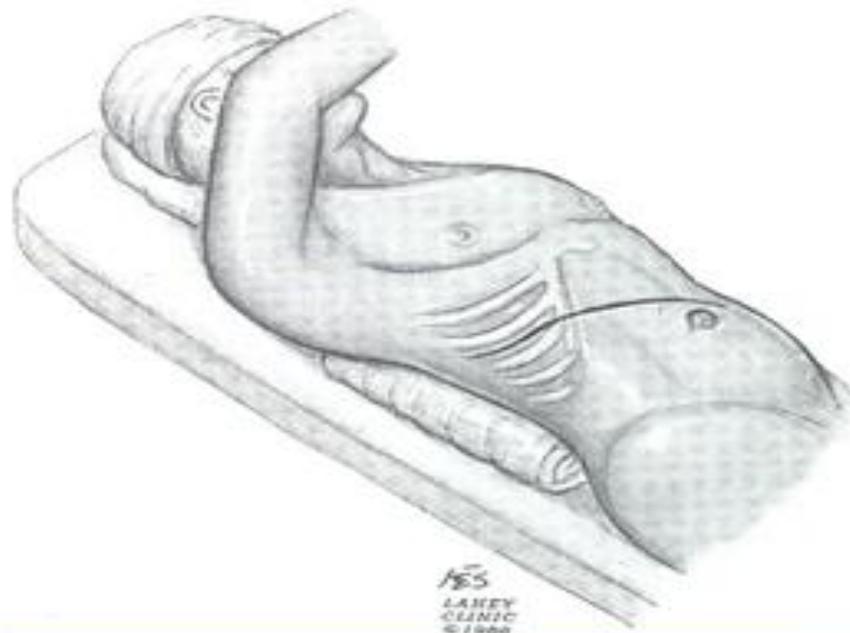
:-

- **Commonly used for** – Mx. of abdominal aortic aneurysms.
 - oesophageal tumors
 - Ant. Approach to lower thoracic & lumbar spine.
 - To approach diaphragmatic hiatus
- Provide wide exposure to lower chest , retroperitoneum & upper abdominal, especially the hiatus.
- Position of patient :- supine , small support extending from the hip to chest of the ipsilateral side.

➤ **INCISIONS :-**

- Chest portion of the incisions may be over the 6th, 7th, 8th intercostal space & abdominal portion may be either midline or paramedian.
- The skin incision – extending from the ant. Axillary line across the costal arch on to the abdomen
- The diaphragm can be divided radially from the chest wall to the hiatus
- Extremely useful in our practice for approaching the diaphragmatic hiatus.
- One must be careful to avoid injury to the phrenic nerve.

Thoracoabdominal Incision



QUESTIONS ????????????

Thank
you