# Chest Wall Tumors

#### محاضره الفرقه السادسه

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# **Chest Wall Tumors**

#### الساده طلاب الفرقه السادسه - كليه الطب البشري – جامعه سوهاج

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# Classification

#### • Primary neoplasm of chest wall:

-Benign : bone , soft tissue

-malignant : bone , soft tissue

- Metastatic neoplasms to chest wall: sarcoma, carcinoma
- Adjacent neoplasms with local invasion: Iung, breast, pleura
- Non-neoplastic disaease: cyst, inflammation (TB,
- Others ; post radiation necrotic chest wall neoplasm

# Benign rib tumors

- Osteochondroma
- Chondroma
- Fibrous dysplasia

# Benign soft tissue tumors

- Desmoid
- Lipoma
- Fibroma
- Neurilemoma

Primary Malignant rib tumors :

- Myloma
  Chondrosarcoma
- >Osteogenic sarcoma
- Ewing sarcoma ..... children
  Lymphoma

### Primary malignant soft tissue tumors

- Malignant fibrous histocytoma (fibrosarcoma)
- Rhabdomyosarcoma...... children
- ≻Liposarcoma
- Neruofibrosarcoma
- ≻Hemangiosarcoma
- >Leiomyosarcoma

# **INCIDENCE**<sub>1</sub>

- Primary chest wall tumors are uncommon.
- 50-80 % of these tumors are malignant.

 Soft tissues are major sources of chest wall tumors.

# INCIDENCE<sub>2</sub>

- The most common primary malignant chest wall tumors are :
- 1-malignant fibrous histiocytoma
- 2-rhabdomyosarcoma
- 3- chondrsarcoma.
- The most common primary benign chest wall tumors
- 1-cartilaginous tumors
- 2-desmoids
- 3-and fibrous dysplasia

# Signs and Symptoms

- Most often clinical manifestations are :
- ≻1- palpable mass
- ≻2-± pain
- > 3-± abnormality detected on CXR.
- Fever, leukocytosis and eosinophilia may accompany some chest wall tumors

# Signs and Symptoms<sub>2</sub>

□ Most patients have no symptoms initially.

Later, Pain may occur in nearly all malignant tumors and 2/3 of benign tumors.

Pain occurs when normal structures are compressed or periosteal invasion

### Diagnosis

History
Clinical Examination
lab investigations
CXR

CT scan, bone scan to rule out multiple lesions

#### 

can distinguish tumor from vessels and nerves, but does not assess lung nodules and calcification in the lung.



Incisional biopsy (tumor > 5 cm) or excisional

(< 5 cm) biopsy.

□The location of excisional biopsy should not interfere with subsequent treatment

■Needle aspiration biopsy should be avoided (only done for patients with a known primary tumor elsewhere -? metastasis).

#### **Differential Diagnosis**

#### Pulmonary infection : actinomycosis

### ➤TB chondritis

#### Costochondral separation

**Tietze's syndrome** (non specific chondritis)

#### Surgical management<sub>1</sub>

#### Successful treatment in general means :

#### □Adequate resection

#### Dependable reconstruction

## Surgical management<sub>2</sub>

#### ➢IF malignancy is diagnosed :

- wide resection is required which must include en block resection of the entire biopsy site.
- 2-3 cm soft tissue clear margin & removal of one normal rib above & below the involved ribs
- 4 cm or greater resection margin is adequate to provide the best long term survival.
- Resection margin of 2cm is adequate for most benign tumors.

# Surgical management 3

#### □<u>High grade malignancy</u>:

This include removal of the entire involved rib ,partial ribs above and below the tumor .

#### **Tumors of the sternum, manubrium** :

Resection of the involved bone and corresponding costal arches.

# Surgical management<sub>4</sub>

Any attached structures, such as lung, thymus, chest wall muscle or pericardium must be removed.

The role of resection of chest wall metastasis and recurrent breast cancer is controversial

# **Chest Wall Reconstruction**<sub>1</sub>

# Goal:

Protection of the intrathoracic organ

Support of respiration by preventing paradoxical movement

acceptable cosmetic result without compromising an indicated cancer operation"

# **Chest Wall Reconstruction**<sub>2</sub>

#### To Gain the Goal , Consider : ➤ Size and location of the defect

Medical history and local condition of the wound

- Structural stability of the thorax
- Soft tissue coverage

# **Chest Wall Reconstruction**<sub>3</sub>

Ideal material for chest wall replacement

- Readily available in operation room
- Easy to adapt for any contour
- Durable without erosion
- Infection resistant

#### Skeletal reconstruction1

#### No reconstruction

- Defect size < 5 cm in greatest diameter in any location
- High posterior defects less than 10cm because overlying scapula provide support however, if the defect is located near the tip of the scapula, it should be closed.
- Skeletal resection in patient who previously irradiated may not require skeletal reconstruction since the lung is frequenly adherent to the parietal pleura and pnumothorax unlikely to occur.

# Skeletal reconstruction<sub>2</sub>

### <u>All other defects should be</u> <u>reconstructed by :</u>

- Autogenous tissues
  - Fascia lata
  - Ribs
  - Myocutanous flap

#### Prosthetic material

- -Mesh
- PTFE patch
- Metals
- Mesh impregnated with methylmethacrylate

# **Skeletal reconstruction**<sub>3</sub>

If the wound is contaminated from previous radiation necrosis or necrotic neoplasm :

Reconstruction with prosthetic material is not advised, myocutanous flap is preferred

#### Soft tissue reconstruction

#### Muscle alone

#### Myocutaneous flaps

i) Latissimus dorsi - Thoracodorsal artery
ii) Pectoralis major - Pectoral branch of
thoracoacromial, internal mammary, lateral thoracic
arteries
iii) Rectus abdominus - Superior and inferior epigastric
arteries
d) Free flaps

#### • Omentum

Reserved for partial thickness reconstruction or back up procedure when muscle either not available or failed

# **1-A Benign Rib Tumors**

#### **Osteochondroma**

- It is the *most common benign bone Tumor* (50% of benign rib tumors).
- It arises from the metaphyseal region of the rib and present as a stalked bony protuberance with a cartilaginous cap.
- Radiologically Calcification at the periphery and within the tumor
- Osteochondroma always present as a painless mass in young males (Male: Female = 3:1)
- Onset of pain may indicate malignant degeneration
- Treatment: resection

#### Benign Rib Tumors ....

#### <u>Chondroma</u>

- 15 % of bebign neoplasm of rib cage
- M and F equally affected, occur at any age ,Lobulated mass.
- It occurs anteriorly at costochondral junction.
- radiographically © It presents thinning of the cortex
- Differentiation of chondroma and chondrosarcoma is difficult or impossible on clinical and radiographic examination
- It should be treated as malignancy.

### Benign Rib Tumors ....

#### Fibrous dysplasia

- It is a lesion with fibrous replacement of medullay cavity of the rib.
- Albright's syndrome( multiple bone cysts, skin pigmentation and precocious sex maturity in girls ) should be suspected if multiple lesions occurs.
- Treatment should be conservative.
- Many lesions stop growing at puberty.
- Resection is indicated if pain and enlarging lesions occurs.

### Benign Rib Tumors.....

#### Eosinophilic granuloma

- It is not a true neoplasm.
- It may be a part of Histiocytosis X or eosinophilic granuloma of lung
- Multiple lesions of rib are common.
- It's associated with pain & localized tenderness.
- Pathologic fracture can developed.
- <u>Chest x-rays</u> : punched-out osteolytic lesion
- Microscopic: consists of chronic granuloma.
- Treatment ; <u>Solitary lesion</u> : excision , <u>Multiple lesions</u> : radiotherapy

## 1-B Benign Soft Tissue Tumor Desmoid

- 40 % of all demoids occur in the chest wall and the shoulder.
- Encapsulation of vessels and brachial plexus in arms and neck is common.
- The tumor may extend into the pleural cavity and displace mediastinal structure.
- Desmoid is most common in people of between puberty and 40 years of age.
- Men and women was affected equally.
- The tumor originates in muscle and fascia.
- The tumor must be treated with wide excision, Recurrence may occur if inadequate excision.
- Tumors are a form of benign fibromatosis or low-grade fibrosarcoma
- Additional radiotherapy (external beam or brachytherapy) after resection is recommended

# **2-A Malignant Rib Tumors**

#### **Myeloma**

(1) It is the most common malignant rib tumor.

(2) Most myelomas involving chest wall are systemic myeloma.

(3) Most myeloma occurs in people of 40-60

- (4) radiographically. Punched-out lesion with cortical thinning
- (5) Pathologic fracture is common.
- (6) Local excision is for diagnosis.

(7) Radiation is for a solitary lesion and both radiation and chemotherapy for multiple lesion.

(8) 5-year survival is 20 %.

### 2-A Malignant Rib Tumors....

#### Chondrosarcoma

- 30 % of all primary malignant rib tumors .
- It is almost a tumor of the anterior chest wall.
- Most chondrosarcoma occurs in people of 30-40 years and male.
- All tumors from costal cartilages should be considered malignant.
- Pathological fracture is uncommon.
- Chest wall chondrosarcoma grows slowly and metastases occur late if it is left.
- Association between trauma and chondrosarcoma suggested
- Excisional biopsy is indicated

# 2-A Malignant Rib Tumors.... Osteogenic sarcoma

- Incidence: 10-15 % of malignant tumors
- It is more malignant and less common than chondrosarcoma.
- Presentation rapidly enlarging painful firm mass
- First metastasis to the lung
- Radiology sun burst appearance
- It is more common in teenagers and young adults.
- The male is more common than the female.
- Serum ALP is frequently elevated.
- Pathologic fracture is rare.
- The treatment is wide excision± chemo ± radiotherapy
- 5-year survival is 20%.

## 2-A Malignant Rib Tumors....

#### Ewing's sarcoma

- Ewing's sarcoma is (5-10 %)
- It frequently occurs in children & young man, 2/3 patients is
- younger than 20 years
- Male: Female = 2:1
- Intermittent pain & inflammatory response with fever and leukocytosis may be found.
- Chest x-rays: Onion peel appearance
- Metastasis is common (Lung, CNS).
- Radiation is the treatment of choice and Multimodality therapy is also used.

## **2-B Malignant Soft Tissue Tumors**

#### **Malignant Fibrous Histiocytoma**

- It is the most common primary chest wall tumor that the thoracic surgeon was asked.
- Painless slowly growing mass
- Systemic symptoms sometimes present .. fever
- Some of them may be radiation induced
- Lobulated and spread along the facial planes which account for high recurrence
- It is most common in people of 50-70 years of age. 2/3 of patients are male.
- The tumor was unresponsive to radiation and chemotherapy, so wide resection is the choice.
- 5-year survival is 38 %.

#### 2-B Malignant Soft Tissue Tumors.... Rhabdomyosarcoma

#### It is the second most common malignant soft tissue tumor.

- Rapidly enlarging mass deep in muscles
- It is most common in children and young adults.
- The tumor is neither painful nor tender, despite rapid growth.
- Wide excision with postoperative chemotherapy and radiotherapy results in 5-year survival of 70%.

## 2-B Malignant Soft Tissue Tumors.....

#### Liposarcoma

- (1) It is common in people of 40-60 years of age.
- (2) Most patients are men.
- (3) Treatment is wide excision. 5-year survival is 60 %.

#### Neurofibrosarcoma

- (1) Chest wall neurofibrosarcoma occurs along the intercostal nerve.
- (2) It is most common in people of 20-50 years of age. Most patients are male.
- (3) Half of patients are associated with von Recklinghausen's disease.
- (4) Treatment is wide excision.

### 3 -Tumors of the manubrium, Sternum, Scapula and Clavicle

1. Primary tumors of the manubrium and the sternum constitute 15 % of the chest wall tumors, but nearly all are malignant.

2. The sternum is a frequent site metastasis from the breast, thyroid and kidney.

#### **Metastatic Tumors**

- Hematologic dissemination is most common : Thyroid, Breast, Kidney.
- Radiation therapy is used for palliation.
- Breast and lung cancers are direct extension.
- 5% of non small cell lung cancers invade the chest wall.
- 5 years survival rate is about 60% for pt. with chest wall invasion without LN involvement, but with N1 ~ 35% and N2 ~ 7-16%.

# Thank You