Pathology of Mediastinal Tumors

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Most common lesions (adults)

Superior
- Thymoma and thymic cyst
- Malignant lymphoma
- Thyroid lesions
- Parathyroid adenoma

Anterior
- Thymoma and thymic cyst
- Germ cell tumors
- Thyroid lesions
- Parathyroid adenoma
- Malignant lymphoma
- Paraganglioma
- Hemangioma
- Lipoma

Posterior
- Neurogenic tumours
  - Schwannoma
  - Neurofibroma
  - Ganglioneuroma
  - Ganglioneuroblastoma
  - MPNST
  - Neuroblastoma
  - Paraganglioma
- Gastroenteric cyst

Middle
- Pericardial cyst
- Bronchial cyst
- Malignant lymphoma
Clinical presentation

50% of the patients are asymptomatic, lesion discovered incidentally

Symptoms from compression or invasion of adjacent structures, including chest pain, cough, dyspnea

Superior vena cava syndrome usually due to malignancy
• In adults metastatic lung carcinoma and malignant lymphoma
• In children malignant lymphoma and acute leukemia
Metastatic tumors

May mimic primary mediastinal neoplasm, primarily in the middle mediastinum where most lymphnodes are situated

Direct mediastinal extension or nodal metastases:

• Lung carcinoma, e.g. SCLC with huge mediastinal mass but small bronchial lesion

• Tumors of esophagus, pleura, chest wall, vertebra or trachea

• Metastases of breast, thyroid, nasopharynx, larynx, kidney, prostate, testicular germ cell tumors and malignant melanoma
Anatomical borders

B Horizontalschnitt durch den Brustkorb (Höhe 8. Brustwirbel)
Lymph node dissection: additional tissue shell
Inflammatory diseases

**Acute mediastinitis**
- Predominantly posterior mediastinum
- Perforation of esophagus, descent of infection from within the neck, spread from chest wall infection, after heart surgery

**Chronic mediastinitis**
- Anterior mediastinum
- Mycotic (histoplasmosis) or tuberculous

**Idiopathic fibrosing mediastinitis**
- Associated with retroperitoneal fibrosis, inflammatory pseudotumor of the orbit, etc. Cave: DD Hodgkin‘s lymphoma
Cysts

• **Pericardial** (coelomic cysts)

• **Foregut cysts**: Bronchial, esophageal, gastric, enteric, pancreatic

Thyroid and parathyroid lesions

• Struma with *nodular hyperplasia*, pulled down into the anterior prevascular or the retrotracheal compartment (posterior descending goiter)

• 7% of **parathyroid adenomas** found in superior mediastinum
Pat. 41 yrs, tumor left pericardial apical

Benign coelomic cyst

Calretinin
• Unilateral (developmental) or multilateral thymic cyst (reactive)

• Acute thymic involution (stress, HIV)

• Thymic follicular hyperplasia of B-lymphocytes (Myasthenia, HIV)

• Myasthenia gravis: Normal, follicular hyperplasia or thymoma
Thymoma

Neoplasm of epithelial cells, admixed with immature thymocytes

**Type A:** when epithelial cells have spindle/oval shape  
**Type B:** when epithelial cells have dendritic, plump, epithelioid shape  
**Type C:** overt atypia such as carcinoma

**ABC rule:**
- **A** atrophic (spindle cell thymic cell of adult life)  
- **B** bioactive (biologically active organ of the fetus and infant)  
- **C** carcinoma

**A, AB, B1, B2, B3, C**
Masaoka and TNM stage

I  macroscopically completely encapsulated and microscopically no capsular invasion
II 1  Macroscopic invasion into surrounding fatty tissue or mediastinal pleura or
II 2  Microscopic invasion into capsule
III  Macroscopic invasion into neighbouring organ, i. e. lung, pericardium or great vessels
IVA  Pleural or pericardial dissemination
IVb  Lymphogenous or hematogenous metastasis

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<th>Masaoka stage</th>
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1. Encapsulated: T1
2. Minimally invasive: T2
3. Widely invasive or pleural or pericardial implants: T3/4
4. Metastatic: N1-2, M1
Thymoma prognosis

- **Stage** (single most important prognosticator)

- Histologic type: A<AB<B1<B2<B3<C

- Completeness of excision

- Myasthenia gravis
Malignant lymphoma

Anterior, superior or middle mediastinum; thymus or nodes

1. Hodgkin‘s lymphoma: young females, nodular sclerosis, cysts
   Cave: multilocular thymic cyst, sclerosing mediastinitis

2. Lymphoblastic lymphoma: Usually immature T-cell type

3. Large cell lymphoma: Large vesicular irregular nuclei

4. Marginal zone B-cell lymphoma: Sjögren‘s disease, IgA type
Lymphoma Service (M. Tinguely)

Send fresh tissue immediately on ice and gauze

1. Fix
Morphology
Immunophenotyping by IHC
ISH, FISH, PCR (DNA, RNA)

2. Freeze
Molecular diagnostic
PCR, also long distance
Southern blot

3. FACS
Immunophenotyping
Co-expression
Frozen section (Schnellschnitt)
Germ cell tumors

20% of mediastinal tumors and cysts

*Origin from extragonadal germ cells, related to the thymus*

- Seminoma (always within thymus)
- Teratoma (mature, immature, with somatic type malignancy)
- Embryonal carcinoma
- Yolk sac tumor
- Choriocarcinoma

- *Mixed germ cell tumors*
Pat. 26 yrs, tumor anterior mediastinum

Hematothorax right side:
Lobectomy RUL and thymectomy
Mixed malignant seminomatous non seminomatous germ cell tumor with immature teratoma moiety
Mesenchymal tumors

Benign

• Lipoma: above diaphragm, DD thymolipoma or lipomatosis (Cushing, steroid, obesity)
• Lymphangioma and Hemangioma
• Solitary fibrous tumor (SFT)

Malignant

• Liposarcoma
• Synovial sarcoma
• Other sarcoma
Pat. 44 yrs, multilocular thymic cyst

Cystic lymphangioma with dysplastic vessels
Neurogenic tumors: Posterior

Tumors of sympathetic nervous system (< 10 years)
Neuroblastoma, ganglioneuroblastoma, ganglioneuroma

Tumor of peripheral nerves (> 20 years)
Schwannoma, neurofibroma, malignant peripheral nerve sheath tumor (MPNST), with rhabdomyoblastic features called „Triton tumor“

Neuroendocrine tumors (thymus)

Typical carcinoid (TC), atypical carcinoid (AC), small cell neuroendocrine carcinoma (SCLC), large cell neuroendocrine carcinoma (LCNEC)

In lung mostly TC and SCLC, in thymus mostly AC
Summary

**Mediastinal lesions**: cysts, benign or malignant tumors

**Frequency** dependent on location: superior, anterior, middle and posterior mediastinum

**Metastases** may mimic mediastinal primary

**Histology** A<AB<B1<B2<B3<C, stage and margins major prognosticators of thymoma
Thank you!