MEDICAL EDUCATION RESOURCE

Axillary Vein & Axillary Lymph Nodes

Axillary Vein

Anatomy

- **Origin** ? continuation of **basilic vein** at the lower border of teres major.
- **Termination** ? continues as **subclavian vein** at the outer border of 1st rib.
- **Position** ? lies **anteromedial to axillary artery** throughout its course.

Tributaries

- Correspond roughly to branches of axillary artery:
    - Veins accompanying superior thoracic, thoracoacromial, lateral thoracic, subscapular, circumflex humeral arteries.
- Major superficial tributaries:
    - **Cephalic vein** (joins near 1st part of axillary vein).
    - Basilic vein (forms axillary vein).

Relations

- **Anteriorly** ? skin, fascia, pectoralis major.
- **Posteriorly** ? axillary artery and brachial plexus cords.

- **Medially** ? ulnar nerve, medial cutaneous nerves of arm and forearm.
- **Laterally** ? axillary artery.

Clinical Anatomy

- **Central venous access**: axillary vein can be cannulated, safer than subclavian in some cases.
- **Injury**: during trauma or surgery, injury may cause **severe hemorrhage** or **air embolism** (negative pressure in thorax).
- **Compression**: in axillary swellings, enlarged nodes or aneurysms may compress the vein ? arm edema.
- **Thrombosis**: effort-related thrombosis (Paget-Schroetter syndrome) can occur in athletes due to repetitive shoulder movements.
- **Surgical landmark**: important in **axillary dissections** (breast carcinoma surgeries).

Axillary Lymph Nodes

General Features

- About **20–30 lymph nodes** present in axilla.
- Function: drain lymph from **upper limb, breast, and thoracic wall**.
- Clinically important as the **main pathway of breast carcinoma spread**.

Groups of Axillary Nodes

1. Pectoral (Anterior) Group

- Location ? along the lateral thoracic vessels, near lower border of pectoralis minor.
- Drainage ? anterior thoracic wall (including most of breast).
- Clinical ? first involved in carcinoma of breast.

2. Subscapular (Posterior) Group

- Location ? along subscapular vessels, near posterior axillary fold.
- Drainage ? posterior thoracic wall, scapular region.

3. Humeral (Lateral) Group

- Location ? along axillary vein, medial to humerus.
- Drainage ? upper limb (except lymphatics following cephalic vein, which drain to apical nodes).

4. Central Group

- Location ? deep in axillary fat, near base of axilla.
- Receive ? lymph from pectoral, subscapular, and humeral groups.
- Drain into apical nodes.

5. Apical Group

- Location ? apex of axilla, near 1st rib and clavicle.
- Drainage ? central nodes, cephalic vein lymphatics, upper part of breast.

- Efferents ? form **subclavian lymph trunk** ? drains into thoracic duct (left) or right lymphatic duct (right).

Lymphatic Drainage Pathway (Summary)

- Breast ? mainly to **pectoral nodes**.
- Upper limb ? mainly to **humeral nodes**.
- Back ? to **subscapular nodes**.
- All ? converge on **central nodes ? apical nodes ? subclavian trunk ? venous system**.

Clinical Anatomy

- **Breast carcinoma**:
  - 75% of lymph from breast drains to axillary nodes.
  - Axillary nodes (especially pectoral group) are first involved.
  - Spread to apical nodes ? systemic dissemination.
- **Axillary clearance (surgery)**:
  - Done in breast cancer operations.
  - Must preserve **long thoracic nerve** (to serratus anterior) and **thoracodorsal nerve** (to latissimus dorsi).
- **Tuberculosis**: axillary nodes may be enlarged in TB infection.

- **Sentinel lymph node biopsy**: identifies first draining node of breast ? used to detect metastasis.

Clinical Anatomy of Axillary Lymph Nodes

1. Carcinoma of Breast

- **Most important clinical relevance**.
- 75% of lymph from breast drains to **axillary nodes**, especially anterior (pectoral) group.
- Spread pattern:
  - Pectoral ? central ? apical ? subclavian trunk ? venous system.
- **Clinical signs**:
  - Hard, immobile axillary nodes in carcinoma.
  - Skin dimpling, nipple retraction, peau d'orange (from lymphatic obstruction).
- **Contralateral spread** ? via parasternal nodes, but axillary involvement is usually earliest.

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2. Axillary Node Dissection

- Performed in carcinoma breast to remove involved nodes.
- **Structures to preserve** during dissection:
  - Long thoracic nerve (to serratus anterior) ? injury causes winged scapula.

    - Thoracodorsal nerve (to latissimus dorsi).

- Used for staging and treatment of breast carcinoma.

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3. Sentinel Lymph Node Biopsy

- First node draining breast (usually anterior group) identified using dye or isotope.
- If uninvolved ? full axillary clearance can be avoided.
- Minimizes morbidity (lymphedema, nerve injury).

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4. Tuberculosis

- Axillary nodes often enlarged and matted in **tuberculous lymphadenitis**.
- May form cold abscesses that track along fascial planes.

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5. Infections of Upper Limb

- Minor infections of hand or arm ? lymphadenitis in axillary nodes (painful, tender swelling).

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6. Systemic Disease

- **Lymphomas and leukemias** present with generalized lymphadenopathy, often involving axillary nodes.

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7. Surgical & Clinical Significance

- **Sentinel node biopsy** ? gold standard for detecting early metastasis.
- **Axillary swellings** ? differential diagnosis includes lipoma, abscess, aneurysm, and lymphadenopathy.
- **Metastatic spread** ? involvement of apical nodes indicates advanced disease.
- **Postoperative complication** ? removal of nodes may cause lymphedema of upper limb.