TRACHEA & OESOPHAGUS

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30-4-2020
TRACHEA

• Also called wind pipe.

• A non-collapsible, membrano-cartilaginous mobile tube.

• Forms the beginning of lower respiratory passage.
• Begins in the neck as a continuation of larynx at the lower border of the cricoid cartilage at the level of lower border of sixth cervical vertebra.
TRACHEA contd...

COURSE-
• Passes downwards through the neck and the superior mediastinum of thorax.
• Ends by dividing into right and left principal bronchi, opposite the sternal angle at the level of lower border of T4 vertebra.
TRACHEA CONTD...

- Trachea lies in median plane except at its termination.

- Near the bifurcation, trachea deviates slightly to the right due to the pressure of arch of aorta.

- Bifurcation of trachea corresponds with lower border of T4 vertebra in cadaver and in supine position.

- Bifurcation extends to T6 vertebra in the living and in standing position.

- In the newborn, trachea bifurcates at the level of T3 vertebra.
During expiration the bifurcation rises by about one vertebral level.

During deep inspiration may be lowered as far as the sixth thoracic vertebra.
DIMENSIONS

LENGTH: 10-11cm (4-6 inch)

BREADTH: Outer Diameter: ~2cm (in adult males)
          ~1.5 cm (in adult females)

- Lumen is ~3mm in newborns and remain so up to the 3\textsuperscript{rd} year of life.
- Lumen increases by 1mm each year up to 12 years.
- Lumen is smaller in living human being than in cadavers.
<table>
<thead>
<tr>
<th>S.NO.</th>
<th>FEATURES</th>
<th>IN CHILDREN</th>
<th>IN ADULTS</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>INTERNAL DIAMETER</td>
<td>≥ 3mm.</td>
<td>12 mm.</td>
</tr>
<tr>
<td>2</td>
<td>PLACEMENT</td>
<td>Deeply placed.</td>
<td>Superficially placed.</td>
</tr>
<tr>
<td>3</td>
<td>MOBILITY</td>
<td>More movable.</td>
<td>Less movable.</td>
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<tr>
<td>4</td>
<td>LOW TRACHEOSTOMY</td>
<td>Risky, because above the supra-sternal notch, crossed sometimes by left brachio-cephalic vein and summit of arch of aorta.</td>
<td>Less risky, because trachea is not usually crossed by these structures.</td>
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STRUCTURES FORMING THE TRACHEA

- Cartilaginous rings.
- Mucous membrane.
CARTILAGINOUS RINGS

- C-shaped hyaline cartilaginous rings.
- ~16-20 in number.
- Deficient posteriorly in order to allow expansion of oesophagus during deglutition.
- The posterior free ends of the cartilage are connected by smooth muscle **trachealis**.
- First ring is the broadest.
CARTILAGINOUS RINGS contd...

- Last ring presents a triangular process known as the carina.

- Carina hooks upwards from the lower margin and surrounds the commencement of two bronchi.
CLINICAL IMPORTANCE of CARINA

- Carina presents a ridge in the interior of tracheal bifurcation..
- Acts as a guide for the surgeon during bronchoscopic or other examinations.
- Mucus membrane at the carina is one of the most sensitive areas and is associated with cough reflex.
The carina

Note vertical RMB

From the head

From the front

Inverted Y Simulating Main Carina

Posterior
- Lined by ciliated pseudo-stratified columnar epithelium.
- Provided with numerous goblet cells.
- Taller cells have cilia.
Cervical part of Trachea

- ~ 7 cm in length.

**EXTENT**

- From lower border of Cricoid cartilage to the upper border of manubrium sterni.
Relations

ANTERIOR-
• Skin.

• **Superficial fascia** containing anterior jugular veins and jugular venous arch.

• Investing layer of **deep cervical fascia**.

• Sternothyroid and Sternohyoid muscles.

• Isthmus of Thyroid gland.

• Inferior Thyroid veins and arteria thyroidea ima.

• Left brachiocephalic vein (in children)

• Thymus gland (in children).

• Brachiocephalic artery (in children).
POSTERIOR-
• Esophagus.
• Recurrent Laryngeal Nerves.

ON EACH SIDE-
• Lobe of thyroid gland.
• Common carotid artery.
• Inferior thyroid artery.
RELATIONS (of thoracic part)

ANTERIORLY:

- Sternum.
- Thymus.
- Left brachiocephalic vein.
- Origins of the brachiocephalic and left common carotid arteries, and the arch of the aorta.
RELATIONS OF TRACHEA CONT'D...

POSTERIORLY:

- Esophagus.
- Left recurrent laryngeal nerve.
RELATIONS OF TRACHEA CONTD...

RIGHT SIDE:
- Azygos vein.
- Right vagus nerve.
- Pleura.

LEFT SIDE:
- Arch of the aorta.
- Left common carotid and left subclavian arteries.
- Left vagus.
- Left phrenic nerves, and the pleura
BLOOD SUPPLY

ARTERIAL SUPPLY
- Inferior thyroid arteries.

VENOUS DRAINAGE
- Left brachiocephalic vein.
The lymph drains into the pretracheal and paratracheal lymph nodes.
NERVE SUPPLY

PARASYMPATHETIC- Recurrent laryngeal nerves.

- Motor to trachealis muscles.
- Secretomotor to glands.
- Sensory to mucus membrane.

SYMPATHETIC-

- Derived from upper 4 or 5 thoracic segments of spinal cord.
- Post-ganglionic neurons are located in middle cervical sympathetic ganglion.
- Vasomotor.
APPLIED ANATOMY

TRACHEOSTOMY-

• Life saving surgical procedure.

• Done in cases of laryngeal obstruction.

• Commonly done in retrothyroid region.

• Trachea is opened by a vertical incision.
OESOPHAGUS

- Muscular tube of 25cm length.
- Connects the pharynx to the stomach.
- Flattened anteroposterioly.
OESOPHAGUS contd...

• Begins in the neck at lower border of cricoid cartilage (at the lower border of C6 vertebra).

• Pierces the diaphragm at T10.

• Opens into the stomach at T11.
Pharyngo-esophageal junction is the second narrowest part of digestive tube.
OESOPHAGUS - DIVISIONS

CERVICAL PART –
• Ends at the lower border of T1.

THORACIC PART –
• Ends at T10 where is pierces the diaphragm.

ABDOMINAL PART –
• Ends at the cardiac end of the stomach.
Cervical Part of Oesophagus

**EXTENT** -

- From lower border of cricoid cartilage to the superior border of manubrium sterni.
- Begins in the midline but inclines slightly to the left as it descends.
Relations

Anterior-
• Trachea.
• Recurrent laryngeal nerves.

Posterior-
• Vertebral column.
• Prevertebral fascia.
• Longus colli muscles.

On each side-
• Lobe of thyroid gland.
• Common carotid artery.
• Thoracic duct on left side.
Arterial Supply

- Inferior thyroid arteries.
Venous Drainage

- Inferior thyroid veins.
- Left brachiocephalic vein.
Lymphatic Drainage

- Pretracheal lymph nodes.
- Deep cervical lymph nodes.
Thank you