The management and complications of head and neck malignancy

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The nature of cancer

- H&N Cancer (6th)
- Incidence in developing countries
- Variety of histological types (SCC)
- Mouth, larynx and hypopharynx
- Male:female
Head and Neck Cancer: Epidemiology

- 500,000 cases worldwide
- 270,000 deaths per annum
- 6% incidence of all cancers (excl. skin)
- 5% mortality of all cancers
- 75% oral cavity/pharynx
- 25% larynx
Head and Neck Cancer: Epidemiology

• Geographical distribution - wide variations
  – France (supraglottic, oral cancers)
  – Hong Kong (nasopharyngeal cancers)
  – India (oral cancers)
• Race - African Americans vs Caucasians
• Gender - Men > Women
  – trend towards increased incidence in women?
The nature of cancer

- Carcinogens (Smoking-p53 mutations and IL 4 receptor)
- RR of <7 cig/d = 2.4
- RR of >25 cig/day = 16.4
- Cessation reduction 70%
The nature of cancer

- Carcinogens (Alcohol)
- Resveratrol (Chemopreventive)
- RR of 7-21u/w (no wine) = 3
- RR of 7-21u/w (30% wine) = 0.5
- RR of >21u/w (no wine) = 5.2
- RR of >21u/w (30% wine) = 1.7
The nature of cancer

- Site specific carcinogens
- Nickel and chromate dust
- Hardwood dust
- Nitrosamines in a salted fish diet <10y age
The nature of cancer

- Iron deficiency (Paterson-Kelly)
- Postcricoid carcinoma
- Young age and common in women
- Mild symptoms and slow progression
- Iron + Vit B
The nature of cancer

- 2 Viruses (HPV and EBV)
- HPV types (6, 18 and 33) – p53 and pRb
- EBV – NPC
- Serum anti-EBV IgA = endoscopic examination + blind biopsies
- HIV
The nature of cancer

- Family History
- RR of 3.5-3.79 HNSCC family history
- RR of 7.89 1st degree relative of patients with multiple HNSCC
keratosis ➔ dysplasia ➔ carcinoma
keratosis $\rightarrow$ dysplasia $\rightarrow$ carcinoma

keratosis $\rightarrow$ dysplasia
Reversal of habits

keratosis
Removal of cause
Malignant transformation

- Premalignant lesion at risk of transforming (6.6% to 36%)
- Continuous monitoring
- Multiple biopsies
- Large population (high-risk patients)
Patterns of Growth: Tongue tumours

Exophytic lesion

Endophytic lesion
The team

- Surgeons
- Oncologists
- General practitioners (Medical and Dental)
- Nurses
- SALT
- Dieticians
- Occupational health team
- McMillan nurses
- Oral Hygienists
- Physiotherapists
- Others
Assessment of cancer patients

• Potentially treatable and not all curable

• Decision (fit for surgery?)
• Palliative (Chemoradio?)

• History (no difference)
• Age + social circumstance + tumour biology
Assessment of cancer patients

- Examination
- Primary site (think T staging) by inspection and palpation

- Neck (triangles)
- Tips: tension off SCM, JD-LN, JO-LN, space of Burns
- Normal structures: C1, C2, thyroid, carotid bulb
Assessment of cancer patients

- Triangles of the neck

- Anterior (submental, submandibular, carotid, muscular)

- Posterior (occipital, subclavian)
Assessment of cancer patients

• TNM
• T classification differs between tumours
• NM classification are universal for most head and neck tumours
• cTNM vs. pTNM
NM classification for H&N tumours

Nx: the regional LNs cannot be assessed
N0: no regional LN metastases
N1: a single ipsilateral LN <3cm
N2a: a single ipsilateral LN 3-6cm
N2b: multiple ipsilateral LN not >6cm
N2c: bilateral or contralateral LN 3-6cm
N3: LN >6cm

Mx: the presence of metastases cannot be assessed
M0: no distant metastases
M1: distant metastases
<table>
<thead>
<tr>
<th>T1</th>
<th>Oral and oropharyngeal</th>
<th>Nasopharyngeal</th>
<th>Hypopharyngeal</th>
<th>Maxillary sinus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary tumour &lt;2cm</td>
<td>Confined to one subsite</td>
<td>Confined to one subsite</td>
<td>Limited to the antral mucosa</td>
</tr>
<tr>
<td>T2</td>
<td>Primary tumour 2-4cm</td>
<td>More than one subsite</td>
<td>More than one subsite</td>
<td>Invades the bone below the Ohngren’s line</td>
</tr>
<tr>
<td>T3</td>
<td>Primary tumour &gt;4cm</td>
<td>Extends beyond the nasal cavity</td>
<td>Invades the larynx</td>
<td>Invades the bone above the Ohngren’s line</td>
</tr>
<tr>
<td>T4</td>
<td>Invade adjacent structures</td>
<td>Invades the skull base or cranial nerves</td>
<td>Invades the soft tissues of the neck</td>
<td>Invade adjacent structures</td>
</tr>
</tbody>
</table>
T classification

- Salivary gland tumours = oral cavity
- Each category divided into “a” and “b”

- a = no local extension of the tumour
- b = local extension of tumour into skin, soft tissue, muscle, bone or nerve

- Microscopic extension is not classified as local extension
Assessment of cancer patients

- Limitations of T staging
  Tumour size not related to prognosis
  Hard to assess clinical extent
  Debatable anatomical boundaries

- Limitation of N staging
  No mention of levels or extracapsular
  Bilateral involvement vs nodes>6 vs prognosis
# Staging of head and neck cancer

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>T1</th>
<th>N0</th>
<th>M0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2</td>
<td>T2</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>Stage 3</td>
<td>T3</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T0</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td>Stage 4</td>
<td>T4</td>
<td>N0/1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>any T</td>
<td>N2/3</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>any T</td>
<td>any N</td>
<td>M1</td>
</tr>
</tbody>
</table>
Assessment of cancer patients

- Staging cancer
- Planning therapy, aid to prognosis, comparison of results and epidemiology

- I, II (low risk)
- III, IV (high risk)
Therapeutic options

• Early stage disease (Stage I and II)
  – Surgery vs radical radiotherapy

• Late stage disease (Stage III and IV)
  – Surgery + PORT
  – Radical RT
  – Radical chemo-RT +/− Surgical salvage
Assessment of cancer patients

• General examination
• Anaesthetic opinion

• Bloods, CXR, ECG…DVT
• Special imaging

• Nutritional status
Head and Neck Cancer: symptoms

• Local
  Depends on subsite
  Oral cavity – ulcer, mass, bleeding, pain, dysarthria, loose dentures
  Oropharynx – pain, dysphagia, odynophagia, otalgia
  Larynx – dysphonia, pain, dysphagia, odynophagia
  Hypopharynx - pain, dysphagia, odynophagia, otalgia

• Regional
  Nodal metastases

• Systemic (<10%): Lung, Liver, Bone
Assessment of cancer patients

- Radiology
- Plain films-CXR
- Contrast studies-barium swallow
- What do you assess?
  - Tongue movement
  - Soft palate elevation
  - Epiglottic tilt
  - Laryngeal closure
  - Pharyngo-oesophageal segment and pharyngeal peristalsis
Assessment of cancer patients

- Biopsy of the node
  FNAC, if –ve, consider open biopsy
- Panendoscopy: synchronous tumours
  Nasopharynx, oropharynx, hypopharynx, oesophagus, stomach, larynx, trachea and upper bronchi
  Biopsies from pyriform fossa, nasopharynx, tonsillar fossa and base of tongue can be acquired
Assessment of cancer patients

- Ultrasound
- Not use ionizing radiation
- Solid vs cystic mass
- Bone, cartilage and gas
- Deep structures
- Doppler US
Assessment of cancer patients

- Computed tomography
- Uses ionizing radiation
- Spiral CT = 3D volume block of data
- IV contrast agent: rim enhancement of LN and increase definition of primary tumour
- Bone-weighted scans (bone architecture)
- Non-bone weighted scan (soft tissue)
Assessment of cancer patients

- Magnetic resonance imaging
- Not use ionizing radiation
- Claustrophobic patients, ferromagnatic surgical clips, embolization coils, pace makers
- Superior soft tissue contrast
- T1-weighted images (fat as white)
- T2-weighted (water as white)
- STIR sequence (suppression of fat signal)
- Inflammation (high water content)
Assessment of cancer patients

- Nuclear medicine
- Uses ionizing radiation
- Spatial resolution, anatomical details
- $^{99m}$Tc methylene disphosphonate
- $^{99m}$Tc dimercaptosuccinic acid
- PET
Treatment options

• Surgery, Radiotherapy, Chemotherapy
• Removal of primary tumour ± neck dissection ± reconstruction
• SCC (locoregional disease)
• Uncontrolled disease primary site
Invasive mandibular carcinoma
Microvascular surgery
Treatment options

- Levels (regions) within the neck which contains group of lymphnodes
  - Level I: submental + submandibular
  - Level II: upper jugular
  - Level III: middle jugular
  - Level IV: lower jugular
  - Level V: posterior triangle
  - Level VI: anterior compartment
  - Level VII: upper anterior mediastinum
Level I: submandibular gland

Level II: upper jugular and jugulogigastric LNs
Lower border: hyoid

Level III: middle jugular LNs
Lower border: cricothyroid membrane

Level IV: lower jugular LNs and the thoracic duct on the left side

Level V: branches of cervical plexus and transverse cervical artery
Neck Dissection

- Radical: I-V, IJV, SCM, spinal XI
- Extended radical: radical + paratracheal LNs, mediastinal LNs, parotid gland
- Modified radical: (1) preserve XI
  (2) preserve XI+INV
  (3) all 3
- Functional = modified radical
Neck Dissection

• Selective neck dissection reduces morbidity

• Supraomohyoid
  I-III, oral cavity tumours drain to these levels
  No damage to thoracic duct

• Anterolateral
  II-IV, laryngeal and hypopharyngeal tumours drain to these levels
Neck Dissection

• Anterior
II-IV + tracheo-oesophageal LNs, thyroid tumours drain to these levels

• Posterior
II-V, tumours in the posterior scalp drain to these levels
Neck dissection plus hemiglossectomy specimen
When do we dissect?

- Radical ND (tumours with N2 neck, recurrent disease, invasive nodal disease)
- Modified radical/selective ND (T3, T4, N1 tumours)
- T1, T2…lots of debate
Treatment options

- Reconstruction
- Free grafts
- ST skin graft
- FT skin graft
- Composite FT skin and cartilage grafts
- Pinch grafts (free skin grafts)
- Dermal and fat grafts
- Fascial grafts
- Chondromucosal grafts
Treatment options

- Flaps
- Local flaps (random, axial pattern)
- Distant axial flaps
- Myocutaneous flaps
- Free flaps

- Radial forearm, fibula, latissimus dorsi, DCIA, scapula, jejenum, rectus abdominus
Postoperative care

- Tracheostomy nursing care
- Removal of secretions
- Humidification
- Changing of tracheostomy tube
- Care of inflatable cuff
- Breathing exercises
- Dressings
Postoperative care

- Leaking drains
- Type of drainage
- Removal of drains
- Feeding
- DVT prophylaxis
# Postoperative care

- **Flap monitoring**

<table>
<thead>
<tr>
<th>Clinical parameter</th>
<th>Normal circulation</th>
<th>Venous occlusion</th>
<th>Arterial Occlusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capillary refill time</td>
<td>Pink</td>
<td>Blue/purple</td>
<td>Pale, mottled blue</td>
</tr>
<tr>
<td>Capillary refill time</td>
<td>1-2secs</td>
<td>&lt;1sec</td>
<td>&gt;2secs</td>
</tr>
<tr>
<td>Temperature</td>
<td>Warm</td>
<td>Warm-cold</td>
<td>Cooler</td>
</tr>
<tr>
<td>Tissue turgor</td>
<td>Full</td>
<td>Distended</td>
<td>Hollow</td>
</tr>
<tr>
<td>Dermal bleeding</td>
<td>Bright red blood</td>
<td>Dark red to pink. Briskly.</td>
<td>Minimal to absence (serum)</td>
</tr>
</tbody>
</table>
Postoperative care

- Medications
- Dressing and sutures
- Postoperative examination
- Discharge and follow up
Complications

- Specific early intraoperative
  Bleeding
  Air embolus
  Pneumothorax
  Carotid artery injury
  Nerve injury (phrenic, vagus, brachial plexus, lingual, hypoglossal, glossopharyngeal)
Complications

• Specific intermediate
  Skin flap necrosis
  Carotid blowout (radiotherapy)
  Chyle leak (thoracic duct)
• Specific late
  Scar contracture
  Neuroma formation (cervical plexus)
  Shoulder pain syndrome (accessory nerve)
  Cellulitis and facial oedema
Recurrent disease

- Chance of salvage depends on
  - TNM stage of recurrence
  - Prior therapy
  - Performance status
  - Co-morbidities
- Frequent episodes of recurrence BEFORE systemic spread
- Large volume recurrence (primary or nodal) carries a poor prognosis
Palliative therapy

- Pain control
- Shrink tumour (airway)
- Control bleeding
Outcomes

• Early stage > Late stage
• Stage I/II - 75-90% 5 year survival
• Stage III/IV - 20-40% 5 year survival
• Significant impact of co-morbid conditions on overall survival
• Significant attrition from 2nd primaries of head and neck and lung
Head and Neck Cancer: effect of co-morbid conditions

- Smoking
  - reduces cure rates from radiotherapy
  - increases treatment morbidity
  - chest and cardiovascular consequences
- Alcohol
  - impact on compliance
  - alcoholic liver and cardiac disease
- Poor nutrition
  - impact on wound healing
  - impact on toleration of chemotherapy/radiotherapy
- Poor dentition
  - dental complications of RT
Avoid Recurrent disease with local fistula and ulceration
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