Techniques in Head and Neck Surgery

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Disclosures

• NONE!
Learning objectives

• to understand how we approach H&N cancer patients
• to understand the basics of head and neck anatomy and how it relates to function
• to understand the basics of head and neck cancer treatment and surgery based on the anatomic subsites
Head & Neck Squamous Cell Carcinoma

- 45,000 cases/yr in the US (3%), over 500,000 worldwide
- Associated with tobacco, alcohol, betel, HPV, chemical exposure
- Overall poor prognosis: 5-yr survival ~50%
- Presents at later stage due to compliance, lack of symptoms
- Early detection is critical
Overview

- Treatment = balance of form and function
- Surgery/radiotherapy/chemotherapy
- Subsite and stage greatly affect our decisions
- Patient factors, preference
HNSCC TNM Staging

- T1: <2cm
- T2: 2-4cm
- T3: >4cm
- T4: extends to bone, muscle, skin, nerve, etc
- M0: no distant mets
- M1: + mets
- Mx: cannot be assessed

- N0: no nodes
- N1: 1 node <3cm
- N2a: 1 node 3-6 cm
- N2b: multiple nodes <6
- N2c: contralateral
- N3: >6cm
Where to begin?

• Referral: dentists, oral surgeons, primary care physicians, self-referral
• History
• Physical exam
• Imaging
• Biopsy
• Operative exam?
History

• Age, gender, risk factors (smoking, drinking)
• Symptoms: pain, mass, referred pain, unilateral hearing loss, hoarseness, dysphagia, cranial nerve deficit, duration
• Medical comorbidities
• Previous cancer history
Physical Exam

- Inspect, palpate, document
- Examine ears, nasal cavity, tongue, floor of mouth, dentition, mucosa, oropharynx, larynx.
- Palpate tongue base, oropharynx
- Palpate neck, salivary beds, thyroid
Imaging

- CT – IV contrast! (unless contraindicated). Good for bone involvement, neck. Poor for tongue, larynx
- MRI – IV contrast. Good for soft tissue (tongue, larynx) – less consistency in reporting.
- PET/CT – good for whole body screen
- Ultrasound – gaining favor
Biopsy

• Depends on accessibility and the patient
• Often can be done in office with topical anesthesia
• Fine needle biopsy of neck nodes
Operative Diagnostics

• Direct Laryngoscopy – allows for most complete examination of upper aerodigestive tract. Can obtain biopsies of larynx, nose, hypopharynx, etc.
• Deep palpation
• Esophagoscopy?
• Bronchoscopy?
Now What?

- Discuss findings with patient
- Assess their thoughts/needs/concerns
- Present to multidisciplinary tumor board: surgeons, med/rad oncology, speech/language pathology, social work, nursing, dietician, maxillofacial/oral surgery/dental, reconstructive surgery
- Design treatment around patient
H&N Treatment Paradigms

Primary surgery + radiation indicated in advanced oral cavity cancer

- Low local control for primary radiotherapy for advanced oral cavity (30-40%) and poor survival (25%)
- Increased local control with surgery + radiotherapy (60%) and improved survival (55%)
- Local control significantly improved for locally advanced T3, T4 oral cancers using surgery + postoperative radiotherapy vs. primary RT
Postoperative Chemoradiation for Advanced Head and Neck Cancer

• Clear advantage in locoregional control
• Generally indicated for nodal involvement, perineural invasion, T3-T4 tumors, positive margins
• Survival advantage
• Difference in enrollment criteria may suggest survival advantage for locally aggressive tumors without significant nodal disease
Organ Preservation

- Induction chemotherapy, followed by surgery versus chemoradiation for advanced larynx cancer
- Ultimately, 64% of patients were able to keep their larynx
- Validated use of chemoradiotherapy as primary treatment modality

VA Larynx Study: NEJM 1991;324:1685-1690
Combined chemoradiotherapy as primary therapy

- T2-T4 squamous cell carcinoma, N0-N3 neck disease
- Randomized to hyperfractionated XRT vs concurrent Chemo/XRT (cisplatin + 5-FU)

• The overall survival rate 53% vs 40%, p=0.02
• Locoregional failure 18% vs. 31%, p=0.007
• Severe (grade 3 or higher) adverse effects 41% vs. 21% p=0.001
Second hand smoke kills
Paranasal Sinus Cancers

- Low incidence
- Salivary
- Melanoma
- Sarcoma
- Dental

Warning: detailed anatomy ahead!
Treatment

- Usually surgical
- Less need to address necks
- Postop CRT depending on histology
- Reconstruction – maintain nasal/oral separation
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Fibular free flap vs obturator
Treatment

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• Reconstruction – maintain nasal/oral separation
Nasopharynx

- Posterior to choanae
- Behind soft palate
- Airway, eustachian tubes
- Oro-nasal competence – speech, swallowing
Nasopharyngeal Carcinoma

- More common in Asia and Africa
- May be EBV related
- Treatment most often nonsurgical
- Survival improved with addition of chemotherapy
Oral Cavity

- Anterior – lips
- Posterior – circumvallate papillae, anterior tonsil pillars, junction of hard/soft palate
Oral Cavity Function

- Oral competence, mastication, digestion, speech, social interaction,
Oral Cancer

• Has potential to be identified early
• Treatment = **SURGERY**
  – Thickness/stage matters in approaching the neck
  – Reconstruction vs primary closure vs secondary closure
• Chemo/Radiotherapy – for concerning histologic features/+ lymph nodes/margins
Anatomic Concerns

- Muscles: intrinsic tongue, floor of mouth
- Nerves: lingual, hypoglossal, inferior alveolar, marginal mandibular
- Other: Wharton’s ducts, mandible, dentition
Patient 1
History/Physical

- 89 yo woman, lives alone at nursing home with 5 months of left ventral tongue mass
- No risk factors
- Otherwise healthy
- PE: 3x5 left lateral/ventral tongue mass, raised, papillary, nontender. Edentulous.
- Biopsy of tongue x 2 = no evidence of SCC, no dysplasia, inflammation

Warning: detailed anatomy ahead!
Operative Photos
Discussion

- Pathology – verrucous carcinoma, stage II (based on size)
- Did not do neck dissections based on pathology
- Clear margins, no postoperative treatment
- Initially had some difficulty chewing
- 3 years out, no evidence of disease, function intact
Advanced Oral Cancer

- May involve removing significant portions of tongue, jaw, palate
- Reconstructive needs
- Function: swallowing, speech, appearance
- Requires postop chemo/radiation

Warning: detailed anatomy ahead!
Mandibular Split/Swing
Resection/Glossectomy
Final Results
Surgical thoughts

• Reconstruction a major decision
• Possible tracheostomy
• Oral intake?
• Rehabilitation – oral competence, trismus, speech, swallowing
Oropharynx
Oropharynx

• Soft palate to vallecula (in front of epiglottis)
• Function: swallowing, air passage
• Cancer: rising in incidence, HPV related
• Often presents with lymphadenopathy (cystic)
• May be treated surgically – transoral, lateral approach, versus mandibular split
• Trend towards chemoradiotherapy
Case Study

• 54 yo with left neck mass
• Presented 7/2007 painless L neck mass – needle biopsy was negative, repeat bx on 2/18/08 negative as well, lots of lymphocytes and macrophages
• Nonsmoker, occasional beer on weekends, works as short order cook
• PMH: HTN, GERD, anxiety, HLD
• Exam shows 2.5 cm mass level II, mobile
• Normal fiberoptic exam
Repeat needle biopsy inconclusive, lymphocytic population identified

Taken for excisional bx 3/25/08, initially thought to be inflammatory, ie Kikuchi’s

Final path = SCC, no ECS, 2.0x3.5x3.0

Plan: PET/CT, laryngoscopy/biopsy, completion neck dissection, XRT, chemo

Warning: detailed anatomy ahead!
Surgical Option
Clinical Course

• Left neck dissection performed – no further positive lymph nodes
• Laryngoscopy – identified tumor in L tongue base/tonsil*
• T1N2a, Stage IV
• Had R submandibular gland transfer
Seikaly H et al, Laryngoscope 2001 Feb;111(2):347-52
Follow up

- Had postop chemoradiotherapy
- 3.5 years after treatment, remains disease free
- Works as a short-order cook
- Good salivary production
Discussion

- CRT = Surgery for outcomes
- Oropharynx often requires XRT or CRT along with surgery
- Complications: dysphagia, trismus, xerostomia, stricture, VPI
Surgical Thoughts

- Mandible split/swing, resection, free flap is a lot to go through
- Is reconstruction required?
- CRT required anyway
- Is transoral resection feasible?
- Which patients are best for surgery?
TORSTM
(TransOral Robotic Surgery)

• Minimally invasive approach
• Good resections, good results (functional and oncologic)
• Patient selection?
Hypopharynx
Hypopharynx

- Bottom of throat – posterior/inferior to epiglottis, up to hyoid, down to level of upper cervical esophagus
- Critical in swallow function, prevention of aspiration
Hypopharyngeal Carcinoma

- Often presents late stage – lack of symptoms
- 1st sign often is dysphagia
- CRT generally less successful
- Surgery often quite morbid depending on stage
Approaches to hypopharynx
Anatomic/surgical concerns

- Area of natural narrowing – difficult to access surgically
- Endoscopic best if possible
- Proximity to larynx – worry for post-therapy aspiration
- Recalcitrant to chemoradiation
- High chance for nodal spread
Larynx

- Superior horn of thyroid cartilage
- Cricoarytenoid ligament
- Corniculate cartilage
- Cricoid cartilage
- Cricothyroid joint
- Conus elasticus
- Arch of cricoid cartilage
- Thyroid cartilage (superior border)
- Superior thyroid notch
- Muscular process
- Vocal process
- Arytenoid cartilage
- Vocal ligament
Larynx anatomy and function

- Arytenoid is the mobile joint
- Vocal cord mucosa = vibratory layer
- Thyroid cartilage provides framework
- Voice, communication
- Breathing – window to the trachea
- Last protective element to prevent aspiration
Normal Laryngoscopy vs Cancer
Larynx Cancer

- Early stage (T1-2) – radiotherapy vs endoscopic laser surgery
- Later stage (T3-4) – chemoradiotherapy vs ELS vs open partial surgery
- Late stage (T4) – total laryngectomy
- Less propensity for nodal spread
Supraglottic Larynx

- Higher chance of nodal spread (must address necks!)
- More swallowing than voice related function
Open partial laryngeal surgery
Endoscopic Laser Surgery

• Custom resections
• Incisions avoided
• Rarely requires tracheostomy
• Good oncologic/functional outcomes
• Requires patience and expertise
When all else fails

- Total laryngectomy – tried and true approach, esp for T4 tumors (thyroid cartilage involvement)
- Allows for swallowing, no aspiration risk
- Allows for TE voicing
- Best oncologic outcomes
Surgical Thoughts

- Quick, little thinking involved
- Surgical technique affects QOL
- Main nerve = hypoglossal
- Best chance for cure, sometimes function
- Permanent stoma
- Multidisciplinary approach
Unknown Primary

- Neck mass – biopsy proven squamous cell carcinoma
- No obvious mucosal primary
- To OR for exam and biopsies – nasopharynx, tonsil, tongue base, pyriform sinus
- Neck dissection + XRT +/- chemotherapy
Neck Dissection

- Used for treatment in N+ disease
- Used for staging in N0 disease
- Used for up front surgical treatment
- Used after chemoradiotherapy as planned treatment
Levels of the Neck

- NP – II-V
- OC – I-IV
- OP – II-IV
- HP – II-IV/VI
- SG – II-IV
- L – II-IV/VI
Anatomic Structures

- **Muscles** – sternocleidomastoid, digastric, omohyoid, strap muscles
- **Nerves** – marginal mandibular, spinal accessory, lingual, hypoglossal, vagus, phrenic, brachial plexus, cutaneous
- **Structures** – internal jugular vein, carotid artery, thoracic duct (left), submandibular gland
Classification

- Radical ND – remove SCM, IJ, CN XI
- Modified RND – save any of those 3 structures
- Comprehensive ND – implies levels I-V
- Selective – anything less than I-V
- Supraomohyoid – levels I-III

Warning!
Surgical Thoughts

• Very common procedure: either curative or adjunctive
• Limited side effects, though lots of structures at risk
• Shoulder ROM, potential effects on swallowing
• Generally well tolerated
I Wish I Knew How to Quit You

Marlboro Red or Longhorn 100's - you get a lot to light.

Warning: The Surgeon General Has Determined That Cigarette Smoking is Dangerous to Your Health.
What’s the future?

- Molecular detection, vaccines, screening
- Surgery:
  - New techniques (SMG transfer)
  - New technology – TORS, robotics
- Radiotherapy:
  - IMRT – gamma/cyber knife
  - Salivary sparing, dose reduction
- Chemotherapy/Immunotherapy:
  - Targeted agents
  - Personalized treatment
Conclusions I

- Early detection is critical
- H&N cancer management is a team approach
- Multimodality therapy for all but very early stages: surgery, radiation, chemotherapy
- Surgery isn’t always bad!
Conclusions II

• Treatment and rehabilitation concerns vary with stage/subsite & is related to anatomy
• Significant morbidity due to any therapy is possible: cosmesis, xerostomia, dysphagia, social dysfunction
• Smoking cessation is essential!
Thanks for your attention