Surgery of the ear

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Introduction

- Anatomy
  - external ear
  - middle ear
  - inner ear
- Diseases
- Diagnosis
- Surgery
Anatomy

- External ear
  - “L” shaped canal
  - separated into vertical and horizontal portions
Anatomy

- External canal cartilages
- Tragus, antitragus and antihelix form external acoustic opening
Anatomy

- External canal
  - auricular cartilage
  - annular cartilage

Auricular cartilage forms canal and fits against annular cartilage.
Anatomy

- **External canal**
  - the external ear canal is attached to the external auditory meatus by fibrous connective tissue
  - canal lined by stratified squamous epithelium; contains hair follicles, sebaceous glands (more superficial in epithelium) and modified apocrine tubular ceruminous glands (deeper)
  - glands more numerous in vertical canal
External canal

cerumen is product of both sebaceous glands and tubular ceruminous glands, along with desquamated epithelial cells
Anatomy

- **Middle ear**
  - middle ear ossicles
  - eustachian tube
  - nerves
  - resides in osseous bulla
Anatomy
10 - stylomastoid foramen
9 - bulla
8 - external acoustic meatus
Anatomy

• Middle ear

  - nerves:
    * facial n.
    * chorda tympani
    * tympanic branch of glossopharyngeal (para)
    * sympathetic innervation from cranial cervical ganglion
Anatomy

- Middle ear
  - 2 membranes in mesotympanic chamber: tympanic and cochlear (round) window
  - stapes attached to ring around oval (vestibular) window
Anatomy

- **Cat middle ear**
  - larger hypotympanum
  - smaller rostrolateral component (epi and mesotympanum)
  - separated by bony septum
  - lining has more ciliated and secretory cells than dogs
Tympanic plexus widely distributed across bony promontory.
Rostrolateral component

Ventromedial component (hypotympanum)
Physiology of middle ear

- Cells and mucus are excreted through the auditory tube to the pharynx
- Auditory tube - equilibrium of pressures
- Ossicles transmit sound from atmosphere to fluid of inner ear
Inner ear

- Resides in temporal bone
- Communicates with middle ear via vestibular and cochlear window
- Innervated by vestibular cochlear nerve
Diseases

• Neoplasia

• Prognosis dependent on histogenesis, location, structures involved, and staging
  - SCC on margins of ear in cat
  - with complete excision: median disease free interval 19-22 months, median survival 799 d
  - types of surgery for pinna: excision, cryo, PDT
  - tumors of ear canal may require TECA + BO and adjunctive tx
Neoplasia

- MCT on pinna

Previous excision

Recurrence
Neoplasia
Infection

- Majority of surgical disease
- Early in disease
  - look for dermatopathies; consider referral to dermatologist
  - atopy
  - food allergy
  - other dermatopathies
3 surgical procedures

- Lateral ear canal resection (Zepp)
- Ventral Bulla Osteotomy (VBO)
- Total Ear Canal Ablation and Bulla Osteotomy (TECA+BO)
Lateral Ear Canal Resection

- Reversible changes in ear
- Removal of small tumors in lateral wall
- Alters conformation
  - opens canal
  - permits it to dry out by decreasing humidity and moisture
  - helps medicate directly into horizontal canal
Poster Child
Lateral ear canal resection

- Must be done early, before irreversible changes have obstructed canal
- Biggest error is waiting too long to perform procedure
- If wait too long will have to perform TECA+BO
Lateral ear canal resection
Lateral ear canal resection
Lateral ear canal resection
Lateral ear canal resection
Lateral ear canal resection - variation: vertical canal ablation
Lateral ear canal resection - vertical canal ablation
Lateral ear canal resection: vertical canal ablation
Middle ear disease

- PSOM in Cavalier King Charles Spaniels
- Aka: “glue ear” or otitis media with effusion
- Does occur in other breeds (boxers, dach, Shih Tsu)
PSOM

- **Signs:**
  - pain in head and neck
  - holds neck in guarded position
  - itchy ears, head tilt, excessive yawning, ataxia, drooping lid or lip (facial nerve paralysis), seizures, loss of hearing, vestibular disease
  - very similar to syringomyelia
PSOM

- **Diagnosis:**
  - bulging tympanum on otoscopic exam
  - radiographs
  - CT

- **Treatment**
  - myringotomy
  - possible VBO
  - cause unknown so may recur and require further treatment
    (increased mucus production, decreased drainage)
VBO

- common indications
  - septic otitis media
    via tympanic membrane, nasopharynx (eustachian tube),
    hematogenous (rare)
  - inflammatory polyps
VBO

- Inflammatory polys in cats
- Arise from epithelium of bulla or auditory tube
- Usually young cats
- Usually a sequela of viral nasopharyngeal infection (calici, herpes)
Important structures: hypoglossal nerve, mandibular salivary gland, linguofacial veins, maxillary veins, lingual artery
VBO

- In cats must open both chambers
- Larger usually filled with mucus secretions and polyp is in smaller rostrolateral chamber
- Polyps not usually associated with infection, however usually perform C/S; prognosis usually excellent
- Horner’s can occur from injury to sympathetic innervation - usually resolves in days to weeks
- Vestibular signs can occur from pressure on labyrinthine structures; did it predate Sx? May resolve with time
TECA+BO

- End stage ear disease
- Preferred technique for extensive infection, especially if extending into middle ear
- Ceruminous gland ACA
- Failed lateral ear canal resection
TECA+BO
Irreversible changes to ear canal. Medications are of no benefit at this time. Proliferation of glands and epithelium within canal and on pinna.
TECA + BO

- Imaging important
TECA + BO

- Lollipop incision
- Dissect very close to cartilage to ext. aud. Meatus
- Preserve the facial n. - was it functional before Sx?
- Watch out for the retroglenoid v. and carotid a
Oh Sh...!
• Oh Shoot!

Usually able to control hemorrhage but can ligate carotid if needed
TECA + BO

- Open bulla laterally and ventrally - bone can be hard and thick; rongeurs or a burr if brave
- Ensure removal of all epithelium of canal and lining of bulla
- C/S - but removing canal and bulla contents will significantly help in treatment of infection especially since a resistant organism is likely
- To place drain or not to place drain?
TECA + BO
Complications

- Facial nerve neuropraxia or paralysis
- Injury to labrynthine structures resulting in vestibular signs
- Fistulation/recurrent infection from failure to remove epithelium
- Hemorrhage (life threatening is rare)
Questions?