DIAGNOSING ODONTOGENIC CYSTS AND WHEN YOU REQUIRE CLINICAL AND IMAGING CORRELATION

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GENERAL COMMENTS

Need to know nomenclature of teeth, dental terminology and common abbreviations.

Good macroscopic descriptions help esp relationship of cyst to tooth, state of tooth (as a guide to whether it is vital or non vital), unilocular vs multilocular cyst, identification of solid areas, luminal projections (all affect likely differential diagnoses).

Need to be familiar with looking at imaging and realise not all radiolucencies are cysts.
WHO 2017 CLASSIFICATION OF ODONTOGENIC CYSTS

INFLAMMATORY
Radicular/residual
Inflammatory collateral (paradental) cyst

DEVELOPMENTAL
Dentigerous (follicular)/eruption cyst
Odontogenic keratocyst
Orthokeratinised odontogenic cyst
Lateral periodontal/botryoid odontogenic cyst
Gingival cyst (adult and infant)
Glandular odontogenic cyst
Calcifying odontogenic cyst
MY APPROACH

Cysts with usually non specific histology
Cysts with squamous nodules
Cysts with relatively specific histology
CYSTS WITH NON SPECIFIC HISTOLOGY – radicular, residual, inflammatory collateral & dentigerous/eruption cysts

**Rarely** specimen includes tooth with attached cyst and histology is diagnostic (macroscopic description alone is often very very helpful)

**More usually** specimen consists of fragments of tissue or a ruptured cyst +/- detached tooth or tooth fragments

**Histology** - variably inflamed cyst lined by non keratinised epithelium with no specific features +/- ulceration and no daughter cysts or islands of ameloblastomatous epithelium in wall
RADICULAR CYST

- MUST be associated with non vital tooth or extensively necrotic dental pulp, usually apically located. If tooth associated with radicular cyst is extracted and cyst persists it is then known as a residual cyst
- CLINICAL NOTES – typically “cyst associated with apex of non vital tooth”
- MISLEADING INFORMATION - Clinician may assume tooth is non vital because there is a periapical radiolucency, most dentists are unlikely to advise that endodontic treatment done inadvertently on vital tooth (ie periapical radiolucency was associated with vital tooth originally), testing of tooth vitality not 100% accurate, clinician likely to suggest cyst rather than other common differentials as medicare benefit
- MACRO/IMAGING – usually lesion/radiolucency at apex of tooth root, tooth may be grossly carious, obvious endodontic treatment but may be normal appearing if non vital due to trauma
- DDx for periapical radiolucency associated with non vital tooth – radicular cyst, periapical granuloma, periapical abscess (these three account for 99%) and uncommonly others
INFLAMMATORY COLLATERAL CYST

Commonly associated with impacted partly erupted mandibular molars (usually 3\textsuperscript{rd} molars, uncommonly 1\textsuperscript{st} and 2\textsuperscript{nd} molars) and attached to portion of cemento-enamel junction (CEJ), but not enclosing crown – commonly known as paradental cysts in Australia.

Rarely cysts beside root of fully erupted vital tooth with periodontal disease.

CLINICAL NOTES – typically “Cyst associated with partly erupted impacted tooth”

MACRO/IMAGING – cyst is usually attached to part of cemento-enamel junction (CEJ) of partly erupted mandibular third molar.
DENTIGEROUS (FOLLICULAR) CYST

**MUST** be associated with crown of unerupted tooth and entirely surrounded by bone - if partly erupted through bone technically known as an **eruption cyst**

**CLINICAL NOTES** – typically “pericoronal cyst associated with impacted, unerupted tooth”

**MISLEADING INFORMATION** – clinician suggests cyst for non cystic lesion esp dental follicle

**MACRO/IMAGING** – surrounds crown of tooth attached to entire CEJ

**Radiologic DDx** – Dental follicle, dentigerous cyst, odontogenic keratocyst, odontogenic neoplasm
ODONTOGENIC CYSTS WITH SQUAMOUS NODULES – gingival, lateral periodontal, botryoid odontogenic and glandular odontogenic cysts

- **SOFT TISSUE** Gingival cyst of adult
- **INTRABONY** Lateral periodontal cyst (unilocular), Botryoid odontogenic cyst (multilocular) & Glandular odontogenic cyst (uni- or multilocular and other features also present)
GLANDULAR ODONTOGENIC CYST

WHO 2017 – “confident diagnosis” when 7/10 of following present - variable thickness of epithelium, luminal low cuboidal/columnar “hobnail” cells, intraepithelial microcysts, apocrine metaplasia, clear cells in basal and parabasal layers, papillary projections (tufting) into lumen, mucus cells, squamous nodules, cilia, multiple cystic compartments

I require
- squamous nodules
- intraepithelial glands/microcysts (often containing mucus)
- cuboidal to columnar eosinophilic (hobnail) cells +/- cilia on luminal surface of intraepithelial glands/microcysts/macrocyts to make a confident diagnosis

May be unilocular or multilocular
Changes can be relatively focal.
Some recur, are locally aggressive and may need resection
ODONTOGENIC CYSTS WITH RELATIVELY SPECIFIC HISTOLOGY

- Odontogenic keratocyst
- Orthokeratinised odontogenic cyst
- Calcifying odontogenic cyst
- Cystic odontogenic neoplasms

**NB** - Need to know cyst is associated with mandible/maxilla but otherwise clinical information/imaging not absolutely required for diagnosis
ODONTOGENIC KERATOCYST

**HISTO** - Thin parakeratinised squamous epithelium (lacking granular cell layer) with tall cuboidal/columnar basal cells, palisaded basal nuclei +/- corrugated luminal surface +/- daughter cysts in wall

**NB** – can lose typical features if inflamed
- parakeratin can be seen in other cysts, rarely focal orthokeratin can be seen in OKC
ORTHOKERATINISED ODONTOGENIC CYST

**HISTO** – Extensively orthokeratinised with granular cell layer, flat to cuboidal basal layer, no daughter cysts

**NB** – focal orthokeratin can be seen in other odontogenic cysts
CALCIFYING ODONTOGENIC CYST

• **HISTO** – Lined by ameloblastoma like epithelium (ie basal layer with columnar cells, palisading and reverse polarity of nuclei) but also including ghost cells and calcification (within ghost cells +/- within stroma)

• **DDx**- other odontogenic ghost cell lesions ie dentinogenic ghost cell tumour (solid lesion) and ghost cell odontogenic carcinoma (overtly malignant lesion)

• **NB** – ameloblastoma can have ghost cells (but seen at high power rather than at low power)
UNICYSTIC ODONTOGENIC NEOPLASMS

Unicystic ameloblastoma
Adenomatoid odontogenic tumour
Others rarely
WHEN DO YOU NEED CLINICAL AND RADIOLOGIC CORRELATION FOR DIAGNOSIS OF ODONTOGENIC CYSTS?

- Usually essential for those with non-specific histology (90% of odontogenic cysts), useful in subclassification of cysts with squamous nodules and limited use in those with relatively specific histopathology.
REFERENCES

• WHO classification of head and neck tumours, 2017