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Episode 1:

Esthesioneuroblastomas originate from what type of cells?

Esthesioneuroblastomas arise from olfactory cells.

Esthesioneuroblastomas classically have a dumbbell-shaped appearance. Where is each part of the dumbbell typically located?

An esthesioneuroblastoma typically starts at the cribriform plate (olfactory cell in origin) and that is where the waist of the dumbbell typically would be. One end of the dumbbell would extend upwards through the skull base/inferior intracranial vault and the other end of the dumbbell may extend down into the sinuses. Classic imaging appearance is solid enhancing mass at cribriform plate extending upwards into brain with a large cystic component and a solid inferior component extending inferior into sinuses)

An esthesioneuroblastoma typically presents at which age?

Bimodal distribution is common for an esthesioneuroblastoma with onset around age 20 and around age 60.

Which nuclear medicine studies classically show uptake with an esthesioneuroblastoma?

These are often somatostatin positive lesions so you would expect uptake on an Octreotide scan and a Ga68 Dotatate scan. Note that FDG PET has a lot of intracranial uptake so there is early data suggesting that Ga68 Dotatate could be useful as Ga68 Dotatate does not have high brain uptake as with FDG PET. Esthesioneuroblastoma may show uptake similar to that of brain on FDG PET/CT.

What are the top 2 most common locations for a chordoma?

A chordoma originates from the notochord so these can present anywhere from the skull base to the sacrum. The #1 most common location is within the sacrum. The #2 most common location is within the clivus. Chordomas are T2 bright. The thumb sign is when a chordoma projects from the clivus posteriorly and indents the pons.

The top differential consideration for a chordoma of the clivus is what?

Chondrosarcoma. However, compared to a chordoma that is often at midline, a chondrosarcoma is often lateral to midline.

What entity should you think of first if you are given a clinical history of a male teenager with frequent and severe nose bleeds and you are shown an image of a very vascular mass centered in the sphenopalatine foramen that expands the pterygopalatine fossa?

Juvenile nasal angiofibroma.

What is the primary vascular supply of a juvenile nasal angiofibroma?

The ascending pharyngeal artery or the internal maxillary artery. These are very vascular so you would expect a prominent blush on angiography.

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Bonus question: What is the main arterial supply on an angiogram to evaluate a posterior nose bleed?

The sphenopalatine artery. Note that if you are going to treat with embolization you need to make sure there is no variant anastomosis with the ophthalmic artery as you really DO NOT want to embolize the eye.

What is a leading cause of posterior nose bleed that does not present with a mass but rather with multiple arteriovenous malformations (AVMs)?

Osler-Weber-Rendu syndrome aka hereditary hemorrhagic telangiectasia (HHT). This is a high-yield entity for the ABR core exam. Classic on board exams would be a provided clinical history of recurrent nosebleeds and a picture showing telangiectasias of the face and hands. Most common sites of AVMs are nose, skin and liver but AVMs may also be elsewhere like the lungs or GI tract. This is autosomal dominant so expect a family history.

What should you think of first if you are shown a maxillary sinus mass in a 30-40 year old patient that enlarges the maxillary sinus ostium and extends into the nasopharynx without bony destruction?

Antrochoanal polyp. A buzzword for this entity is a mass causing non-destructive widening of the maxillary ostium.

What is the classic location of an inverting papilloma?

The lateral wall of the nasal cavity. Note that inverting papillomas often cause focal hyperostosis that is subsequently is trapped within the mass.

What is the classic MRI appearance of an inverting papilloma?

Buzzword is a “cerebriform pattern” that appears similar to brain on both T1- and T2-weighted images.

Approximately what percent of inverting papillomas harbor a squamous cell carcinoma?

About 10% of inverting papillomas will have an associated squamous cell carcinoma. This is a risk you should be aware of for test purposes.

What is a SNUC and where is the most common location of a SNUC?

SNUC is a sinonasal undifferentiated carcinoma. The most common location of a SNUC is in the maxillary antrum. SNUC is more aggressive and has a worse prognosis compared to a garden variety sinonasal squamous cell carcinoma. A SNUC often presents as a large, mildly enhancing, fungating mass with ill-defined margins.

Sinonasal lymphoma is most common in what age group?

In general, sinonasal lymphoma is most common in the >60 year-old age range. Sinonasal lymphoma tends to be more common in the nasal cavity compared to the sinuses.

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If you are shown a cystic structure at the floor of the mouth that looks like “a sack of marbles” with fat lobules in fluid what is this classic for?

Floor of mouth dermoid/epidermoid cyst. Note that location at floor of mouth and presence of internal fat makes dermoid most likely but these often can't be differentiated on imaging.

What do you call a large mucous retention cyst that arises from the sublingual space and extends inferiorly under the mylohyoid muscle?

A plunging ranula.

In a young adult with a new mass in the left cervical level II region what malignancy do you need to exclude first?

HPV-related squamous cell carcinoma. This presents with large necrotic nodes in the neck. Note that this can look like a brachial cleft cyst but squamous cell carcinoma must be excluded.

Episode 2:

What is the most common salivary gland tumor?

Pleomorphic adenoma (benign mixed tumor). This is most common in the parotid gland (90% in superficial lobe of the parotid) but can also occur in the submandibular and/or sublingual glands. Pleomorphic adenomas tend to be very T2 bright.

What is the second-most common salivary gland tumor?

A Warthin's tumor. This is typically only seen in the parotid gland unlike a pleomorphic adenoma. These are most common in males. Bilateral in about 15% of cases.

If you see a parotid gland tumor that shows uptake with Tc99m-pertechnetate is this most likely a Warthin's tumor or a pleomorphic adenoma?

Warthin's tumor. “War Tech” helps me remember this.

What is the most common malignant tumor of the minor salivary glands?

Mucoepidermoid carcinoma. Has an association with prior radiation to the head and neck.

Are malignant tumors more common in the smaller or larger salivary glands?

Malignant tumors are more common in the smaller salivary glands. The smaller the salivary gland, the more likely that a tumor involving the gland may be malignant.

For board exams, what is the most important finding associated with adenoid cystic carcinoma of the head and neck?

Perineural spread. When you think adenoid cystic carcinoma, you should next think of perineural spread in terms of board exam questions.

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If you are shown images of the head and neck demonstrating a honeycombed appearance of both parotid glands with bilateral parotid masses that are found to be lymphoma, what is the most likely underlying disease state?

Sjogren's syndrome which has a markedly increased risk of lymphoma of the parotid glands. Note that parotid lymphoma may be primary (parotid has internal lymph nodes) or secondary. Differential for diffuse abnormal appearance of parotid gland with mixed solid and cystic lesions is HIV benign lymphoepithelial disease of the parotid.

Note that the episode and originally posted study guide contains an error here. Wharton's duct was incorrectly stated to be associated with the sublingual gland. Wharton's duct is associated with the SUBMANDIBULAR gland.

Bonus: Which salivary gland is the Stensen's duct and the Wharton's duct each associated with?

Stensen's duct: parotid gland. Wharton's duct: submandibular gland.

If you are presented with enlarged lymph nodes in the carotid space what is the #1 differential consideration?

Squamous cell carcinoma nodal metastases.

A head and neck mass that demonstrates the classic salt and pepper appearance on MRI should make you think of which entity first?

Paranglioma. The salt and pepper appearance results from a highly vascular mass that contains foci of hemorrhage. The dark areas (pepper) result from flow voids from the high vascularity and the bright areas (salt) result from internal hemorrhage.

Parangliomas classically light up on which nuclear medicine exam?

In111 Octreotide due to presence of somatostatin receptors. By extension you would also expect uptake to be seen on Ga68 Dotatate PET/CT.

Can you name the principal tumors of the head and neck region that are considered to be paragangliomas?

In no particular order: carotid body tumor, glomus jugulare, glomus vagale, glomus tympanicum. Note that a pheochromocytoma is also considered a paraganglioma but is classic for adrenal glands instead of a head and neck primary mass. A glomus jugulotympanicum also technically exists when a glomus jugulare involves the middle ear cavity but that is perhaps extra credit knowledge.

What is a classic imaging feature of a carotid body tumor?

Carotid body tumors classically present as a mass at the carotid bifurcation that splay the internal carotid artery and external carotid artery.

What is a classic imaging feature of a glomus jugulare?

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A glomus jugulare classically presents as a skull base mass with osseous destruction of the jugular foramen.

What is a classic imaging feature of a glomus vagale?

A glomus vagale classically presents as a mass between the carotid bifurcation and the jugular foramen. To be clearer these classically are located deep to the carotid arteries (internal and external) and in front of the internal jugular vein. Carotid body tumor will splay the ICA and ECA apart. A glomus vagale will push the ICA/ECA forward and the internal jugular vein back.

What is a classic imaging feature of a glomus tympanicum?

A mass with salt and pepper appearance confined to the middle ear, positioned over the cochlear promontory.

What is an imaging feature that can help differentiate between a schwannoma and a paraganglioma?

Compared to a paraganglioma, a schwannoma would be less vascular, therefore not show the classic salt and pepper appearance on MRI.

Episode 3

What are some of the contents of the parotid space?

Parotid gland, portions of facial nerve (lateral to retromandibular vein), intraparotid lymph nodes.

What are some of the contents of the carotid space?

Carotid artery, jugular vein, cranial nerves 9-11, lymph nodes.

What are some of the contents of the masticator space?

Muscles: masticator, temporalis, medial and lateral pterygoids. Mandibular angle and ramus. Inferior alveolar nerve. Note that this space extends through the length of the temporalis muscle upwards through the lateral skull which is a potential avenue of spread of infection or malignancy.

What is the most common cause of a masticator space mass?

Abscess from odontogenic infection.

Infections in the masticator space may classically for board exam purposes spread to which other structures?

Cavernous sinus and/or orbital apex via the pterygopalatine fossa.

What types of sarcoma can classically involve the temporomandibular joint?

Rhabdomyosarcoma and chondrosarcoma may have a TMJ location.

What is the retropharyngeal space “danger space”?

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Potential space seen at midline behind the alar fascia that extends all the way from the skull base to approximately T3 level.

What is the significance of the retropharyngeal/danger space?

Potential space that can facilitate spread of infection or malignancy from the neck into the mediastinum. A classic scenario is spread of tonsillar abscess/infection into the mediastinum.

What are differential considerations if you see necrotic lateral retropharyngeal lymph nodes?

Top considerations for necrotic lateral retropharyngeal nodes include squamous cell carcinoma metastases and papillary thyroid cancer nodal metastases. Enlarged lateral retropharyngeal nodes without necrosis raises the likelihood of lymphoma.

What is Grisel syndrome?

Grisel syndrome occurs when a retropharyngeal abscess causes torticollis and subluxation of the atlantoaxial joint, typically in children. If a question presents you with fever and new torticollis you need to think of this.

What is Lemierre syndrome?

Jugular vein thrombosis and septic emboli from a neck/upper respiratory tract infection. Recent ENT surgery would be common in a question stem. Classic association with fusobacterium necrophorum.

What are some of the contents of the parapharyngeal space?

Branches of the trigeminal nerve, pterygoid veins, and fat.

What is the significance on board exams of the parapharyngeal space?

Classic questions on board exams involve the significance of displacement of the parapharyngeal space because how the parapharyngeal space is displaced can guide to you the source of a mass/infection.

Describe the significance of parapharyngeal space displacement in terms of the surrounding anatomic compartments:

Medial displacement of parapharyngeal space: parotid space process

Anterior displacement: carotid space process

Posteromedial displacement: masticator space process

Lateral displacement: superficial mucosal space

(Another way of remembering this is that there are 4 spaces surrounding the parapharyngeal space. Masticator space is anterior, parotid space is lateral, carotid space is posterior, and superficial mucosal space is medial).

What anatomic structure separates level 1A from level 1B nodes?

Anterior belly of the digastric separates level 1A from level 1B nodes

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What anatomic structure separates level 1B nodes from level 2A nodes?

Stylohyoid muscle

What anatomic structure separates level 2A from 2B nodes?

Internal jugular vein

What is the anatomic structure that constitutes the vertical border of Level 2 and Level 3 nodes?

Lower hyoid

What is the anatomic structure that constitutes the vertical border of level 3 and level 4 nodes?

Lower cricoid

Level 5 lymph nodes are defined as being posterior to what structure?

Sternocleidomastoid muscle

Which cancer is classic for a fossa of Rosenmuller mass in a young adult person of Asian descent?

Nasopharyngeal squamous cell carcinoma. Note that invasion of the parapharyngeal fat is a very bad prognostic sign. The most common location of nasopharyngeal squamous cell carcinoma is the fossa of Rosenmuller and the earliest sign of this entity is often effacement of the fossa of Rosenmuller fat.

Where is the fossa of Rosenmuller?

Posterior and superior to the eustachian tube opening, posterior to the torus tubarius. Hence, nasopharyngeal squamous cell carcinoma can present with a unilateral mastoid effusion. You should particularly consider nasopharyngeal squamous cell carcinoma if you see a unilateral mastoid effusion with enlarged retropharyngeal nodes.

What are the three types of laryngeal squamous cell carcinoma by location? Which of these typically has the best prognosis?

Supraglottic, glottic and infraglottic. Glottic laryngeal squamous cell carcinoma typically has the best prognosis because it becomes symptomatic earlier (and therefore at lower stage) than the other subtypes and is also the most common of the subtypes. Subglottic is often clinically silent and presents with local adenopathy. Transglottic SCC means the tumor is aggressive.

What is the most accurate sign for cricoid invasion on imaging?

If you see tumor on both sides of the cricoid you can suspect cricoid invasion. Cricoid can have normal irregularity so that alone does not confirm invasion. Invasion of the cricoid is a key differentiator between whether the vocal cords may be spared at surgery—invasion means they typically cannot be spared.

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