An important anatomical variation of the FN course in relation to the Retromandibular vein: a case report

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Background

- Transient FN (FN) palsy is a relatively common complication of parotidectomy reportedly occurring in 12 - 40% of cases. However, permanent FNP is less common occurring in 0 - 6% of cases.^{1, 2}
- To minimise the risk of this potential complication, FN identification and preservation is of utmost importance during all parotid surgeries.
- A key landmark used intra-operatively to determine the position of a parotid mass in relation to the FN is the *Retromandibular vein* (RMV). RMV is formed by confluence of superficial temporal and maxillary veins, which in turn penetrates the substance of parotid gland. It normally lies superficial (or lateral) to *external carotid artery* and deep (or medial) to FN.^{1, 3}
- However, as discussed in this case report, this is not always the case and there are anatomical variations that surgeons need to be mindful of.

Case Report

Presentation

- A 9-year-old boy presented with a left sided firm mass on the anterior segment of his parotid gland that had been slowly growing over 2 years.
- The mass was 2x3cm in size and was situated anterior to the left tragus.
- It had not caused any pain, dermatological or neurological symptoms.

Investigations

- Ultrasound scan was performed which revealed the presence of a cystic mass along the Stensen duct together with multiple superficial lymph nodes in the neck and the superficial lobe of the parotid gland. The largest lymph node was 8x11mm in size.
- The patient did not consent to a fine needle aspiration (FNA), and hence this was not performed.

Operation and discovery of the anomaly

- During the operation, a Blair incision was made to expose the greater auricular nerve, which was resected superiorly and reflected inferiorly.
- The parotid tail was then lifted from the sternocleidomastoid muscle exposing the posterior belly of digastric.
- Parotid gland was separated from the tragal cartilage, and a deeper dissection was made through the parotid tissue.
- After identification of the main trunk of FN, the posterior auricular artery was ligated. Main trunk of FN was then followed to identify the anterior branches.
- The mass along with the superficial parotid tissues were carefully resected.

- Surprisingly, it was noted that the lower trunks of FN (cervical, marginal mandibular and buccal) were deep to the RMV, whereas the upper trunks (fronto-zygomatic) were superficial to RMV.
- A cystic mass filled with brown fluid was resected. Histological analysis confirmed that the mass was in fact a salivary duct cyst surrounded by inflammation and reactive lymph nodes.
- There were no operative complications and recovery was uneventful.

Figure 1. Exposure of the Retromandibular vein (RMV) and its relation to facial nerve (FN) trunks

Figure 2. Full exposure of FN, RMV and posterior belly of digastric after removal of the mass

Discussion

- Whilst RMV is the main anatomical landmark used intra-operatively, there are other structures that can be useful landmarks in a pre-operative setting using imaging. These include the Conn's arc, the Utrecht and the FN line.³
- The anatomical variation between FN and RMV has been reported in a number of case reports in the literature.⁴ However, these have mostly comprised of cadaveric cases.⁵⁻⁷ Moreover, this is one of the only paediatric cases in whom such an anomaly has been described in the literature.
- *Toure and Vacher* proposed a classification system for reporting of the anomalies of FN anatomy within the parotid gland in 2010. This was later updated by *Piagkou et al* as cadaveric cases with novel anomalies emerged.

- In this case, RMV was lateral (superficial) to lower trunk and medial (deep) to the upper trunk. Based on the *Piagkou's* classification, this case represents a Type IIc variation, which is a very rare variant.
- Lack of knowledge regarding such a potential anatomical variation can have serious consequences, including risk of major bleeds and post-operative FN palsy.
- Anatomical variations of FN and RMV are also important in other types of surgery where the assessment of the course of FN and RMV form an integral part of the operation, such as osteotomy and open reduction of mandibular condyle fractures.

Conclusion

- Although FN and RMV are usually closely associated lying in proximity of each other, their three dimensional anatomical relationship can vary and may not always follow the textbook descriptions.
- This case highlights the vital need for increasing the awareness of head and neck surgeons with regards to this anatomical anomaly, as it has the potential to lead to serious unforeseen yet avoidable intra and post-operative complications.

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