Introduction

Deep neck space infections (DNSIs) include retropharyngeal and parapharyngeal abscesses. We report a rare complication of left-sided middle cerebral artery infarction precipitated by left common carotid artery compression secondary to a multiloculated parapharyngeal abscess. A 59-year-old woman with poorly controlled diabetes was admitted following a loss of consciousness. Examination demonstrated unilateral right-sided hemiparesis and computed tomography (CT) of the brain revealed an acute left-sided frontoparietal infarct. The patient had been complaining of a fever, left-sided ear redness and pain six days prior. Unfortunately, despite antibiotics in the community, her ear pain worsened to involve her left jaw. Closer examination revealed a swelling in her left submandibular region and a CT of her neck was performed, revealing a multiloculated left parapharyngeal abscess with evidence of left common carotid compression. A naso-pharyngo-laryngoscopy (NPLS) was performed to confirm the presence of an abscess. Owing to the size and complex location of the abscess, management via a prolonged antibiotic treatment was opted for over surgical intervention. After completion there was improvement in medical state and resolution on repeat NPLS. Vascular-related complications are rare following DNSI. Carotid artery compression has been reported, although current literature suggests it to be a benign phenomenon. Our case is the first reported instance of a parapharyngeal abscess with severe neurological complications, reminding physicians that such complications following a DNSI remain possible. Although rare, in the event of a cerebrovascular accident and sepsis, DNSI remains a possible cause to be considered.

Case presentation

A 59-year-old woman, with poorly controlled diabetes (haemoglobin A1c of 10%) and hypertension, was admitted following a sudden episode of loss of consciousness. Her Glasgow Coma Scale on arrival was 10 (eyes 3, verbal 2 and motor 5). Neurological examination revealed unilateral, right-sided hemiparesis, dysarthria, dysphasia (both receptive and expressive) and a right-sided homonymous hemianopia. Initial computed tomography (CT) of the brain revealed an acute left-sided MCA infarct affecting the frontoparietal region (Figure 1).

She was noted to have a fever on arrival of 37.5°C with a raised white cell count of 20 mmol/l and a C-reactive protein concentration of 18 mmol/l, which was attributed to a likely case of aspiration pneumonia. However, on history taking the patient’s daughter recalls her mother complaining of left-sided ear redness and pain, which was treated as an otitis externa, using oral dexamethasone and clarithromycin by her

Abstract

Deep neck space infections (DNSIs) include retropharyngeal and parapharyngeal abscesses. We report a rare complication of left-sided middle cerebral artery infarction precipitated by left common carotid artery compression secondary to a multiloculated parapharyngeal abscess. A 59-year-old woman with poorly controlled diabetes was admitted following a loss of consciousness. Examination demonstrated unilateral right-sided hemiparesis and computed tomography (CT) of the brain revealed an acute left-sided frontoparietal infarct. The patient had been complaining of a fever, left-sided ear redness and pain six days prior. Unfortunately, despite antibiotics in the community, her ear pain worsened to involve her left jaw. Closer examination revealed a swelling in her left submandibular region and a CT of her neck was performed, revealing a multiloculated left parapharyngeal abscess with evidence of left common carotid compression. A naso-pharyngo-laryngoscopy (NPLS) was performed to confirm the presence of an abscess. Owing to the size and complex location of the abscess, management via a prolonged antibiotic treatment was opted for over surgical intervention. After completion there was improvement in medical state and resolution on repeat NPLS. Vascular-related complications are rare following DNSI. Carotid artery compression has been reported, although current literature suggests it to be a benign phenomenon. Our case is the first reported instance of a parapharyngeal abscess with severe neurological complications, reminding physicians that such complications following a DNSI remain possible. Although rare, in the event of a cerebrovascular accident and sepsis, DNSI remains a possible cause to be considered.

Keywords

Parapharyngeal abscess, deep neck space infection, cerebrovascular accident, case report

Middle cerebral artery infarction following common carotid compression due to a multiloculated parapharyngeal abscess

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local general practitioner six days prior. Her ear pain failed to subside and subsequently worsened to involve the left jaw. Closer examination revealed a swelling in her left submandibular region, prompting an otorhinolaryngology consultation.

A CT angiography of the brain and neck was performed, revealing a multiloculated left parapharyngeal abscess measuring 2.7 cm × 1.6 cm and 1.7 cm × 0.9 cm respectively (Figure 2) with evidence of left common carotid and external jugular vein compression by the bulky adjacent muscles and abscess (Figure 3). Of note, the circle of Willis was complete, with no evidence of a structural anomaly on angiographic imaging, although magnetic resonance imaging with angiography could not be performed in this case owing to limitations in resources. A naso-pharyngo-laryngoscopy (NPLS) was performed and confirmed the finding. Owing to the complex location of the collection, management via prolonged antibiotic treatment (intravenous co-amoxiclav) was advised at the time with serial NPLS monitoring. After 14 days of antibiotics and improvement in medical state, a repeat NPLS was performed confirming resolution of the abscess. A carotid Doppler scan was performed after completion of the antibiotics, revealing bilateral atherosclerotic disease, with luminal stenosis of less than 50% in both common carotid arteries. The patient was subsequently discharged well.

Discussion

Although the incidences of DNSI have reduced over time with advancements in medical and surgical interventions, it still remains common amongst those with diabetes mellitus. Common aetiology includes tonsillitis and peritonsillar abscesses in children and of odontogenic origin in adults. Complications can occur including sepsis, mediastinitis, airway obstruction and necrotizing fasciitis amongst others. Vascular-related complications are much rarer, mainly that of venous thrombosis, arterial erosions and pseudo-aneurysms. Common and internal carotid artery compression have been reported, although its significance is debatable. From our literature review (using Pubmed and Ovid MEDLINE), there was only one reported case of carotid artery occlusion following a retropharyngeal abscess, with no subsequent neurological sequelae, although anticoagulation therapy was nonetheless commenced as prophylaxis against such complications. In fact, Hudgins et al. suggested carotid compression to be a benign phenomenon. In the case of our patient, anticoagulation therapy was not commenced due to the presence of an acute infarction involving more than one-third of a unilateral MCA distribution, in fear of precipitating haemorrhagic transformation. Furthermore, there was subsequent improvement of the collection and absence of carotid thrombosis was detected two weeks after cerebral insult onset, which allowed us to forego anticoagulation. To the best of the authors’ knowledge, ours is the first report of a parapharyngeal abscess with severe neurological complications, reminding
physicians that such complications following a DNSI is still plausible. While the aetiology of the stroke is unclear and likely multifactorial, there is a distinct possibility of an embolic event from the carotid stenosis precipitated by a combination of the extrinsic compression from the abscess, localized infection-related vascular wall inflammation and the pre-existing stenotic arterial disease (as seen in carotid Doppler imaging) contributed to by poorly controlled risk factors such as diabetes. However, the finding of a complete circle of Willis would suggest that even in the event of an extreme mass effect completely obliterating ipsilateral carotid inflow, a cerebrovascular accident from hypoperfusion would be extremely rare.

**Conclusion**

Although rare, DNSI can lead to neurological complications through various methods, including that of carotid artery compression. This serves to remind us that in the event of a cerebrovascular accident and sepsis, DNSI remains a possible cause to be considered.

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**Authors’ contribution**

REFRS: Data collection and analysis, drafting of manuscript.

SS: Drafting of manuscript, revision of manuscript.

**Availability of data and materials**

The data that supports the findings of this study are available from Sungai Buloh Hospital but restrictions apply to the availability of these data, which were used under license for the current study and so are not publicly available. Data is however available from the authors upon reasonable request and with permission from Sungai Buloh Hospital.

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**Conflict of interest**

The authors declare that there is no conflict of interest.

**Informed consent**

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

**Ethical approval**

Ethical approval to report this case was obtained from the Universiti Teknologi MARA Ethics Committee (MARA 19/203) and the

**Figure 3.** Axial plan of a CT neck scan moving cranially from (a) to (d), demonstrating compression of the left common carotid artery.
Clinical Research Centre (Sungai Buloh Hospital) Medical Research & Ethics Committee (19/004).

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References
1. Murray AD. Deep neck infections, http://emedicine.medscape.com/article/837048-overview (2018, accessed 12 May 2019).
2. Klug TE, Fischer ASL, Antonsen C, et al. Parapharyngeal abscess is frequently associated with concomitant peritonsillar abscess. *Eur Arch Otorhinolaryngol* 2014; 271: 1701–1707.
3. Holm-Hansen CC, Thisted E and Kaltoft M. Life-threatening complication of parapharyngeal abscess and mediastinitis in a 10-year-old otherwise healthy girl following elective tonsillectomy – first reported paediatric case. *J Laryngol Otol* 2019; 133: 161–163.
4. Caccamese JF Jr and Coletti DP. Deep neck infections: clinical considerations in aggressive disease. *Oral Maxillofac Surg Clin North Am* 2008; 20: 367–380.
5. Reynolds SC and Chow AW. Life-threatening infections of the peripharyngeal and deep fascial spaces of the head and neck. *Infect Dis Clin North Am* 2007; 21: 557–576.
6. Ruff MV, Nasr DM, Klaas JP, et al. Internal carotid artery pseudoaneurysm and ischemic stroke secondary to retropharyngeal and parapharyngeal abscess: a case report and review of the literature. *J Child Neurol* 2017; 32: 230–236.
7. Brito TP, Hazboun IM, Fernandes FL, et al. Deep neck abscesses: study of 101 cases. *Braz J Otorhinolaryngol* 2017; 83: 341–348.
8. Salam A, Khan I, Sonawalla A, et al. Rare mycotic aneurysms of internal jugular vein and innominate vein secondary to untreated parapharyngeal abscess: a case report. *Ann Med Surg (Lond)* 2017; 19: 62–64.
9. Elliott M, Yong S and Beckenham T. Carotid artery occlusion in association with a retropharyngeal abscess. *Int J Pediatr Otorhinolaryngol* 2006; 70: 359–363.
10. Hudgins PA, Dorey JH and Jacobs IN. Internal carotid artery narrowing in children with retropharyngeal lymphadenitis and abscess. *Am J Neuroradiol* 1998; 19: 1841–1843.