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Clinical Records

Survival of a patient with endopharyngeal common carotid blow out due to parapharyngeal abscess as an unusual complication of cholesteatoma

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Abstract
Parapharyngeal abscess as a complication of cholesteatoma is an uncommon entity. Endopharyngeal common carotid artery rupture due to parapharyngeal abscess is also uncommon, and these cases usually end fatally. We present a 17-year-old male with parapharyngeal abscess due to cholesteatoma who developed an endopharyngeal common carotid blow out and survived after common carotid ligation without any neurological sequalae.

Key words: Parapharyngeal Abscess; Cholesteatoma; Common Carotid Artery; Surgical Procedures

Introduction

The parapharyngeal space extends from the base of the skull to the hyoid bone. An abscess in this space can extend down to the infrahyoid region either via the retropharyngeal space or through the medial aspect of the parapharyngeal space.[1] A cholesteatoma can result in a parapharyngeal abscess by involving the sheath of the digastric muscle.[2] Involvement of the apex of the petrous temporal bone by a cholesteatoma and development of a parapharyngeal abscess has also been described.[3] The carotid sheath lies in the retro-styloid parapharyngeal space. A long-standing abscess in this area may lead to rupture of the carotid artery, usually with a fatal outcome. We report a case of cholesteatoma leading to parapharyngeal abscess through involvement of the internal jugular vein (IJV). Surprisingly, the common carotid artery ruptured endopharyngeally, but an unexpected favourable outcome was observed after ligation of the common carotid artery in the neck.

Case report

A 17-year-old male presented with bilateral otorrhoea since childhood, a mass in the right ear for one month, and torticollis of the neck to the left side for seven days. Clinical examination revealed a granulation polyp arising from the right middle ear surrounded by foul-smelling discharge. Examination of the left ear revealed a dry attic perforation. The upper part of the neck on the right side was extremely tender and indurated. Radiological examination of the mastoid documented a cavity on the right side. Our provisional clinical diagnosis was bilateral unsafe chronic suppurative otitis media and aural polyp in the right ear with a right-sided Bezold's abscess.

The patient deteriorated despite antibiotic therapy and there was no sign of localization of pus in the upper part of the neck. On blind tapping about 10 ml of purulent material was aspirated from the right carotid triangle. As the patient's attendants could not afford a computed tomography scan, an emergency mastoid exploration was decided upon. Laryngeal oedema mandated elective tracheostomy before induction of anaesthesia. On opening the mastoid cortex, a cholesteatoma was found extending from the anterior epitympanum to the tip of the mastoid. The granulation polyp described earlier was arising from the attic. The lower part of the sinus plate and adjacent jugular bulb were found to be exposed by the disease. The sinus was yielding and therefore no attempt was made to explore it. Incision and drainage of the neck were performed to release the pus from the carotid triangle.

Following two days of initial improvement, the patient began to suffer massive intermittent fresh bleeding from the mouth, each episode lasting two to three minutes. Five episodes occurred over 12 hours, the amount of blood lost varying between 100 and 200 ml each time. Awaiting examination under general anaesthesia, blood loss was replaced by fresh blood and packed cell transfusion. En route to the theatre, there was a gush of bleeding from the mouth, amounting to 400–500 ml. Under general anaesthesia with tracheostomal intubation, in the tonsillectomy position, meticulous suction revealed a slough in the right posterior lateral wall of the hypopharynx, and the source of bleeding could be visually traced to this area. On careful removal of the slough, the

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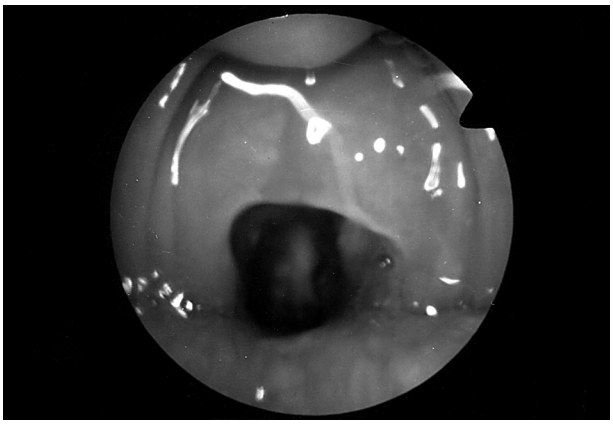

FIG. 1

Endoscopic appearance of hypopharyngeal rupture site at the centre and uvula at the 12 o'clock position.

ruptured hypopharyngeal site could be seen with accompanying torrential haemorrhage. The bleeding could not be stopped with packs. Carotid blow out was diagnosed and carotid artery ligation in the neck was decided upon. Gross oedema of the neck restricted identification of the structures on exploration. The IJV was found to be completely thrombosed. Involvement and rupture of the wall of the right common carotid artery was directly visualized: there was extensive necrosis of the tunica adventitia and intermittent involvement of all three layers,

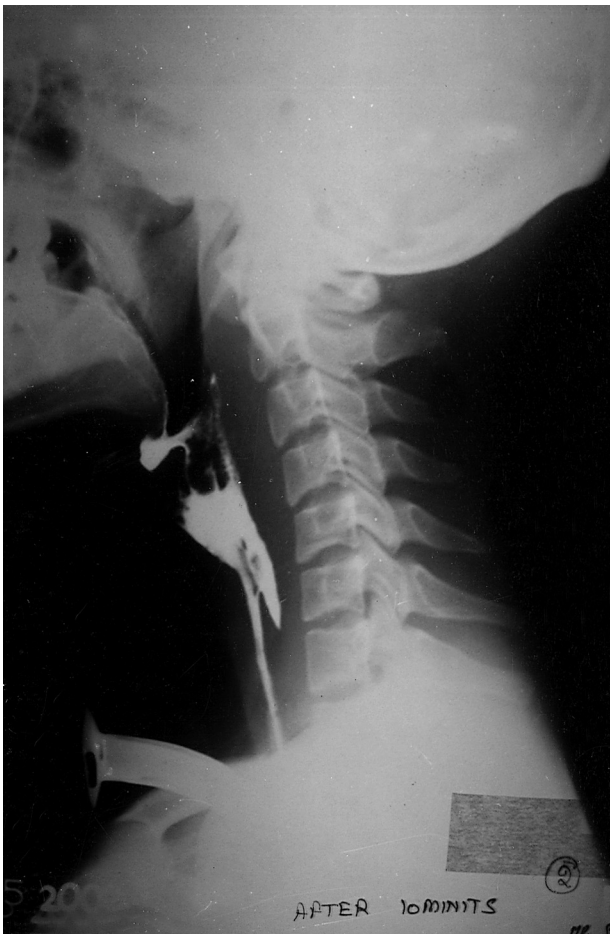

FIG. 2

Barium swallow showing leakage of dye into the retropharyngeal space, from the hypopharyngeal rupture site.

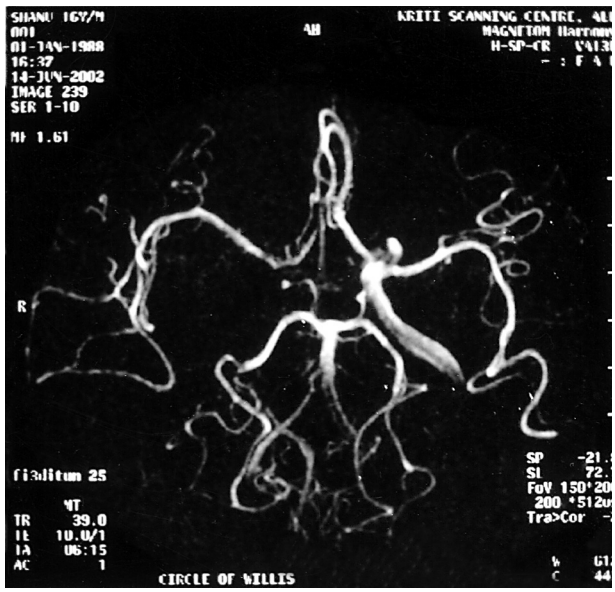

FIG. 3

Magnetic resonance angiogram showing the circle of Willis, obliterated right internal carotid artery and perfusion of right internal carotid territory through the anterior communicating vessel.

whereby the lumen of this vessel was visible in places. Rupture of the common carotid artery was located at multiple levels including the upper border of the cricoid cartilage. The bleeding could be arrested only after ligation of the common carotid artery, below the site of rupture. Massive bleeding some time before slough removal led us to suspect a major arterial source in this case. Moreover, torrential haemorrhage was the indication for the post-mastoidectomy examination under general anaesthesia and subsequent exploration of the neck, and not the effect of intervention.

Surprisingly, the patient did not develop any neurological or ophthalmological complications. Subsequently, the patient had a smooth recovery and

FIG. 4

Magnetic resonance angiogram showing diminished flow in the right carotid vessel; an enlarged vessel arising from the right sub-clavian artery, probably the right thyro-cervical trunk; and both vertebral arteries of equal and normal calibre.

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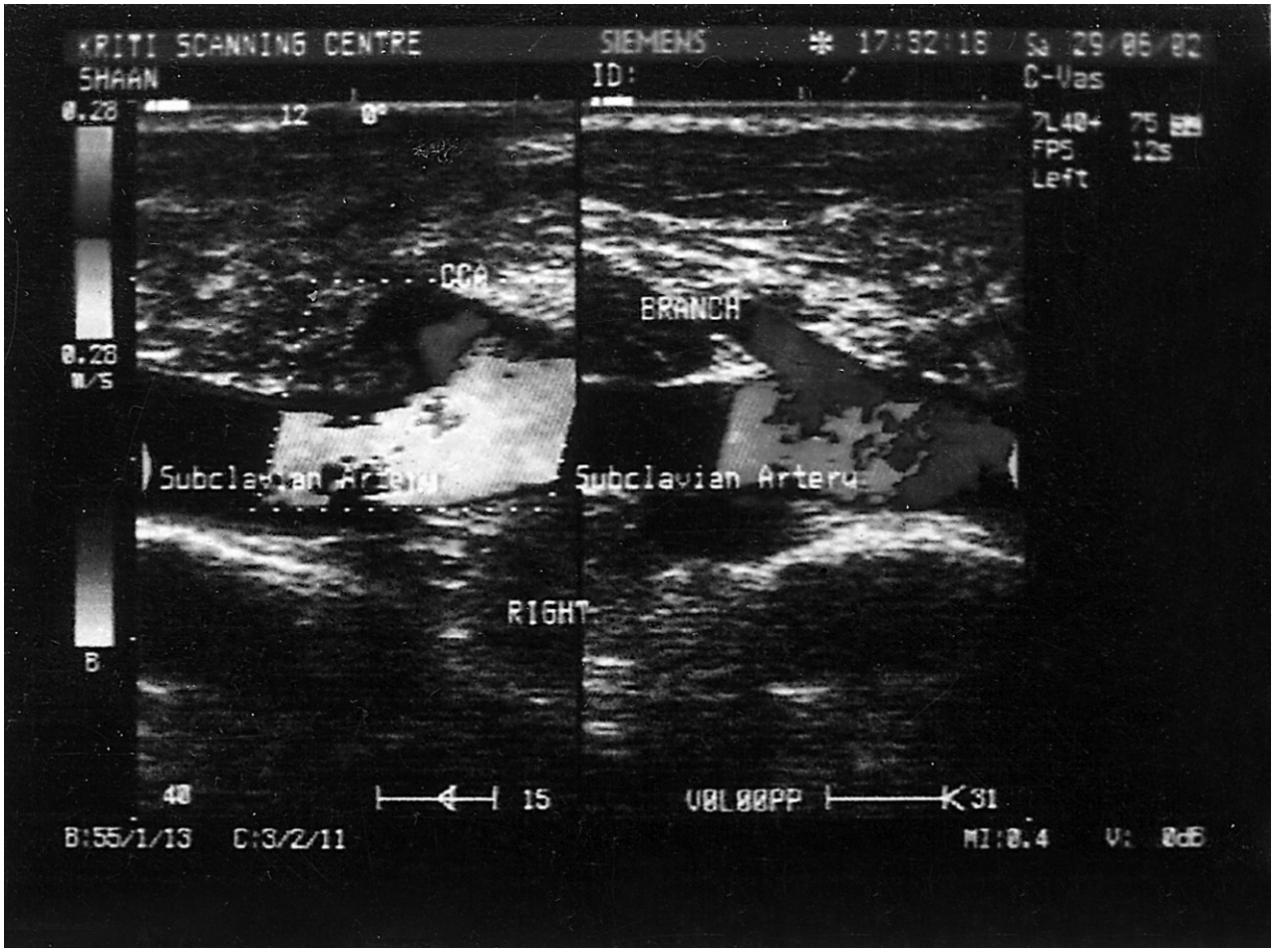

FIG. 5

Colour doppler showing absence of flow signals in the right common carotid artery and enlarged vessels arising from the right subclavian trunk consistent with development of collaterals.

decannulation could be performed after one week. Figure 1 documents the site of hypopharyngeal rupture as seen endoscopically, on the second day of exploration. The barium-swallow X-ray of the hypopharynx and oesophagus six weeks' postoperatively demarcated the site of rupture and ruled out pharyngeal stenosis (Figure 2). Post-operative contrast-enhanced neuro-radiological evaluation at eight weeks documented an obliterated right internal carotid artery and perfusion of the right middle cerebral arterial territory from the contra-lateral internal carotid system (Figures 3–5).

Discussion

Parapharyngeal abscess arising as a complication of cholesteatoma is an uncommon entity in the annals of otorhinolaryngology. Abscess in the digastric muscle (Citelli's abscess) from the mastoid tip can extend into the parapharyngeal space because of its close proximity.[2] Infection of the petrous apex can proceed infero-medially to extend directly into the parapharyngeal space.[3] The parapharyngeal abscess in this case was either due to extension of infection along the digastric muscle, or followed suppuration of lymph nodes along the upper part of the IJV. The latter might be explained by the phlebitis of the IJV, secondary to the downward extension of lateral sinus and jugular bulb thrombophlebilitis.

Classically the parapharyngeal space extends up to the level of the hyoid bone. However, the ruptured site of the hypopharynx and common carotid blow out pointed towards infra-hyoid extension of the abscess.[1] This infra-hyoid extension was probably through the retropharyngeal space, as documented by the post-operative barium swallow.

Parapharyngeal abscess can manifest externally as torticollis of the neck due to spasm of sternocleidomastoid muscle. Though uncommon, this has been previously reported.[4] The presenting feature of torticollis in our case is also in accordance with earlier series.

- **Parapharyngeal abscess is a rare complication of cholesteatoma**
- **In this case report a parapharyngeal abscess was associated with a fistula into the common carotid artery, treated by arterial ligation**

The most unusual feature in this case was the favourable outcome. Moore *et al.*[5] reported 44 strokes (50%) and 33 deaths (38%) among 87 patients with non-elective ligation, in contrast to 15 strokes (23%) and 11 deaths (17%) among 64 patients with elective carotid artery ligation. The circle of Willis or circulus ateriosus cerebri is a potential channel between the carotid and vertebro-basilar arterial systems, which each compensate for obstruction in the other system.[6] Absence of neurological deficit following carotid ligation was suggestive of a well-developed arterial circle in the base of brain.

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In conclusion, cholesteatoma can result in parapharyngeal abscess from thrombosis of the IJV and suppuration in the adjacent lymph nodes. This abscess may extend inferiorly to the parahypopharyngeal space through the retropharyangeal space. A persistent abscess may lead to endopharyngeal rupture and even carotid blow out. Outcome after common carotid artery ligation depends on the integrity and functioning of the circulus ateriosus cerebri.

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