

Spontaneous resolution of internal jugular vein thrombosis in a *Salmonella* neck abscess patient

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Abstract

This article describes a rare case of *Salmonella* neck abscess complicated by internal jugular vein thrombosis in a 51-year-old patient with previously undiagnosed diabetes. The patient was discharged without any complications after a combination of medical and surgical treatment. Also discussed here are the clinical manifestations, imaging findings, and spontaneous resolution of the internal jugular vein thrombosis. Being immunocompromised is a critical predisposing factor for *Salmonella* neck abscess. Patient recovery is largely determined by proper incision, drainage of pus and adequate intravenous antibiotics according to bacterial sensitivity tests. Detection of an internal jugular vein thrombosis does not signify a poor prognosis. Spontaneous resolution of thrombosis is encountered after treating the infection.

Key words: *Salmonella typhimurium*; Neck; Abscess; Jugular vein; Thrombosis

Introduction

Deep neck abscess occurs in the potential spaces between the three layers of deep cervical fascia. Streptococci are the organisms most commonly cultured from deep neck abscesses (Tom and Rice, 1988). However, in an immunocompromised patient, other uncommon organisms may be encountered (Behr and McDonald, 1996). *Salmonella* is a non-encapsulated Gram negative motile bacillus. *Salmonella* infection may lead to the following human diseases: typhoid fever, enterocolitis or bacteraemia with focal lesions. However, deep neck infections caused by *Salmonella* sp. are rarely observed. Previous literature reports include only 12 cases of neck abscess due to this organism, of which, only one was complicated by internal jugular vein thrombosis (Bello and Pien, 1985; Rosenberg *et al.*, 1985; Shikani *et al.*, 1990; Leiberman *et al.*, 1991; Ray *et al.*, 1997; Westblom and Gudipati, 1997). In this article, we describe a diabetic patient who suffered from a *Salmonella* neck abscess complicated by internal jugular vein thrombosis.

Case report

A 51-year-old woman was admitted to our hospital owing to the progressive enlargement of a left neck mass for one week. With no past history of upper respiratory or gastrointestinal infection, the patient also denied receiving dental procedures or experiencing local trauma. Type II diabetes was diagnosed after admission. Physical examination of the neck revealed a 12 cm × 15 cm tender non-fluctuant mass in the left submandibular area, extending posteriorly to the angle of the mandible and superiorly to the mastoid process. Neck computed tomography (CT) scan indicated a poorly defined heterogenous mass enclosing the internal jugular vein over the left submandibular area (Figure 1). Fine needle aspiration of the mass was performed and 5 ml of grossly purulent fluid was

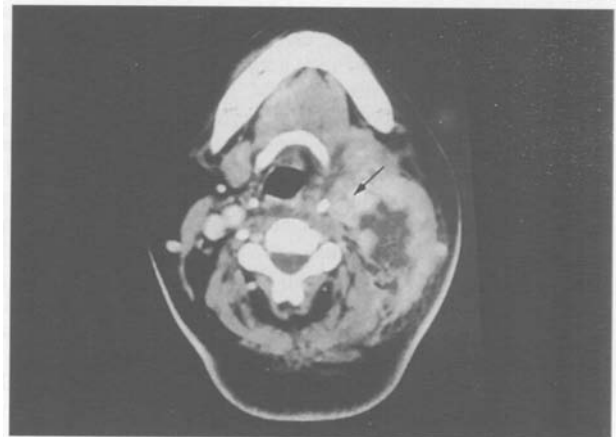


Fig. 1

Axial computed tomographic scan revealed a left neck abscess. Arrow demarcates the compressed internal jugular vein.

collected. The day after admission, the neck mass was incised and drained. Digital exploration of the abscess beneath the sternocleidomastoid muscle resulted in 15 ml of gushing purulent pus. At the same time, a cord-like internal jugular vein covered with thick fibrin was also observed. Wound, blood and stool cultures were taken and, then, parenteral antibiotics were administered. *Salmonella typhimurium* was isolated from the pre-operative and three intra-operative wound cultures. A post-operative CT disclosed pre-existing internal jugular vein thrombosis (Figure 2). The patient was discharged free of symptoms. She continued with three more weeks of oral ciprofloxacin treatment. A month after her initial illness, ultrasonographic examination revealed a patent internal jugular vein (Figure 3).

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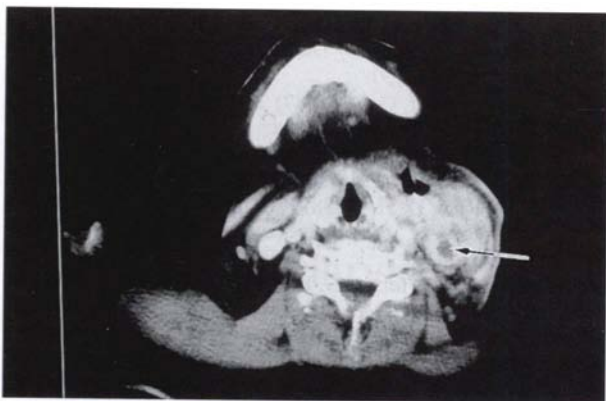


FIG. 2

Axial computed tomographic scan after incision and drainage of left neck abscess. Arrow reveals internal jugular vein thrombosis.

Discussion

Head and neck infections normally arise from *Streptococcus*, *Staphylococcus* or *Haemophilus* species. Neck abscess due to *Salmonella* infection is very rare. To our knowledge, only 12 cases have been reported in which only one was associated with internal jugular vein thrombosis. All of these cases, except for one, were immunocompromised; seven patients were diabetics, and the remaining were victims of malignancy or cirrhosis. After ingesting contaminated food, *Salmonella* spp. invade the cervical lymph node via one of two possible routes. The first route takes place via blood from septicaemia induced by *Salmonella enteritidis* (Cherubin *et al.*, 1974). The second pathway is achieved through direct seeding at the oral tonsil tissue, travelling along the lymphatics to the cervical lymph nodes. The latter pathway best explains the pathogenesis in our patient because there is no evidence to suggest that our patient is a possible chronic *Salmonella* carrier. Repeated blood and stool cultures were negative and CT scan of the gallbladder disclosed no cholecystitis.

Thrombosis is not an uncommon complication of salmonella infection (Cohen *et al.*, 1987). However, of the limited number of cases of *Salmonella* neck infection, only one was documented with internal jugular vein thrombosis. Possible mechanisms of thrombosis formation are as follows: 1) hypercoagulability states due to transient

reduction in protein S level after *Salmonella* infection (Ceyhan *et al.*, 1993), 2) compression of the internal jugular vein by abscess mass, or 3) septic thrombophlebitis. As well known, septic thrombophlebitis of the jugular vein is a manifestation of Lemierre syndrome, frequently caused by *Fusobacterium necrophorum* and anaerobic Gram negative bacillus (Vandenberg and Hartig, 1998). Neither of the organisms isolated in our patient could be attributed to inappropriate sampling for anaerobic culture nor was the *Salmonella* infection sufficient for inducing Lemierre syndrome. The internal jugular vein thrombosis resolved spontaneously one month after the infection being completely treated, as observed in this and the previously reported case. This finding implies that treatment with intravenous heparin or oral warfarin may be unnecessary.

The conventional treatment strategy for *Salmonella* neck abscess involves incision and drainage, along with adequate antibiotics. Multiple drug resistance of *Salmonella* sp. has been noted since the 1970s after the abuse of chloramphenicol and penicillin. A related investigation indicated the resistance of 25 per cent and five per cent of the organisms to ampicillin and chloramphenicol, respectively (Holmberg *et al.*, 1984). Virulence plasmids transmitted between different species of *Salmonella* may profoundly influence the development of drug resistant strains (Guiney *et al.*, 1994). When resistant strains were encountered, as in our case, third generation cephalosporins exhibited a greater effectiveness and caused lower resistance and fewer side effects (Anton *et al.*, 1982; Soe and Overturf, 1987). Although some studies suggest short-term antibiotic use (two to three days), for *Salmonella* neck abscess, long-term use (two to four weeks) was recommended because *Salmonella* sp. may survive in lymphocytes for a long time, protecting them from elimination by antibiotics (Lan *et al.*, 1986; Finley and Falkow, 1989). In addition, patients are susceptible to becoming chronic carriers if the infection is improperly treated.

Conclusion

Salmonella infection must be considered in immunocompromised patients with deep neck infection unresponsive to empirical antibiotic use. Early diagnosis and proper drainage are essential for *Salmonella* neck abscess. Culture and drug sensitivity tests profoundly influence the initiation of the proper antibiotics and preventing severe complications. Treatment should also focus on controlling underlying diseases, including diabetes. The detection of internal jugular vein thrombosis does not imply a poor prognosis. Specific treatment is usually unnecessary since thrombosis spontaneously resolves after treatment of the infection.

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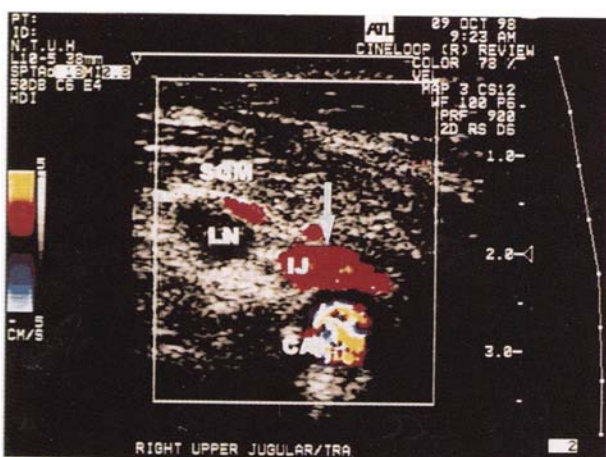


FIG. 3

Colour Doppler ultrasonography of left neck revealed the patent internal jugular vein one month after incision and drainage (arrow). SCM = sternocleidomastoid muscle; LN = lymph node; IJ = internal jugular vein; CA = carotid artery.

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