

Salmonella neck abscess associated with jugular vein thrombosis

A. LEIBERMAN, M. D.,* F. TOVI, M.D.,* Y. BARKI, M.D.,† M. ALKAN, M.D.‡ (Beer-Sheva, Israel)

Abstract

An unusual case of synergistic infection caused by *Salmonella paratyphi* and anaerobic streptococcus resulting in necrotizing cervical infection associated with deep neck abscess and internal jugular vein thrombosis, is presented. *Salmonella* acting as an oxygen consumer in the infected tissues, facilitates the growth of anaerobic cocci, hence the development of a devastating soft tissue infection. The precipitating cause was a tonsillar infection developing due to 'post-anginal sepsis'. The aetiopathogenesis of the cervical infection is discussed.

Introduction

The anatomical proximity of cervical fascial spaces to common sites of infection in the head and neck, make them vulnerable during the course of upper respiratory tract infections (Barlet and Gorbach, 1976; Lewitt, 1976). Abscess formation, septic jugular vein thrombosis and a necrotizing process in the cervical soft tissues are well-known consequences of deep neck infections. The common pathogens in this condition are Gram positive cocci or a combination of Gram positive and Gram negative bacilli (mixed flora). In the latter situation, the presence of aerobic and anaerobic organism may give rise to synergism resulting in a necrotizing soft tissue infection. *Salmonella* is closely related to the normal enteric flora being one of the fermentors included in the group of enterobacteriaceae. Infections caused by this organism are often accompanied by bacteraemia (Hook, 1990). Focal abscesses are not uncommon (Saphra and Wasserman, 1954), but their occurrence in the head and neck is rare (Shikani *et al.*, 1990; Gudipati and Westblom, 1991). We have recently treated a patient in whom the above combination complications occurred as a result of an unusual synergism between *Salmonella paratyphi* and anaerobic streptococci. The pathogenesis of this rare condition will be discussed.

Case report

A 25-year-old pregnant woman presented with left-sided neck swelling and pain. She had suffered from a sore throat two weeks earlier for which she received oral penicillin. Her past medical history was unremarkable.

On admission, she was febrile (38.5°C). Physical examination revealed pregnancy of 16 weeks. Otorhinolaryngologic examination was normal. Neck examination showed a 5 × 7 cm, tender and non-fluctuant swelling along the left sternocleidomastoid muscle. The results of routine blood count, blood chemistry examination were within normal limits. IV crystalline penicillin (10,000,000 Units/daily) was initiated. Despite this treatment the cervical swelling progressed and the fever failed to resolve. By the fourth day of admission, hyperaemia and fluctuation in the lower neck were noted. An ultrasound study of the neck showed the presence of a non-homogeneous mass in the left neck, compatible with

abscess formation. The internal jugular vein appeared to be thrombotic (Fig. 1). Blood cultures failed to yield any growth. According to the clinical and ultrasonic findings, surgery was indicated.

Exploration of the left neck revealed foetid purulent material along the carotid sheath. The lower aspect of the sternocleidomastoid muscle was necrotic. At the same level the internal jugular vein appeared as a cord-like structure covered with fibrin. Needle aspiration failed to reveal blood. The cephalic part of the vein was patent. The adventitia of the carotid artery sheath was also inflamed. Pus was drained and the necrotic tissues were debrided. The wound was dressed open. Samples were obtained for culture and histopathology. Anaerobic streptococci and *Salmonella paratyphi* (type A) were cultured. The histological features of the debrided tissues were compatible with a necrotizing soft tissue infection. The anti-

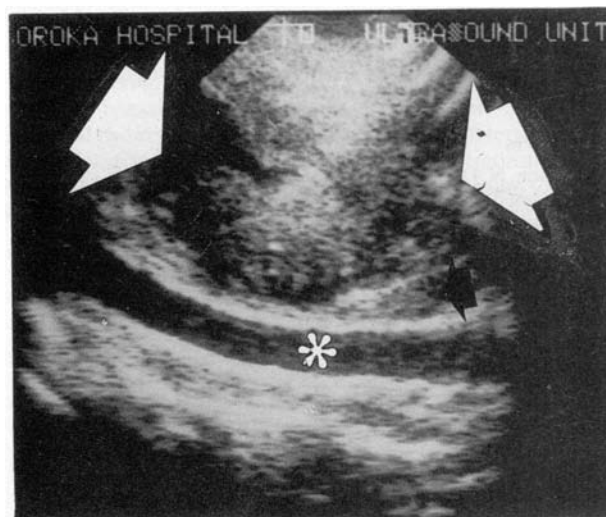


FIG. 1

Longitudinal ultrasound scan through the large vessels of the neck shows a non homogenous inflammatory mass (white arrows) lateral to the internal jugular vein. The lumen of the vein is obliterated by the mass (black arrow). The common carotid artery (*) is demonstrated medially.

biotic regimen was changed according to sensitivity test and Ceftriaxone was given IV, 2 gm/daily. The post-operative course was uneventful. At repeated bedside daily dressing, additional necrotic tissue was debrided. An ultrasound study of the gall-bladder, performed in order to rule out cholecystitis as the initial site of Salmonella infection, showed no abnormality. By the third post-operative week, healthy granulation appeared and the wound closed secondarily. The patient was discharged free of symptoms. A month later a repeat ultrasound showed a patent jugular vein.

Discussion

Salmonellosis is usually acquired through the gastrointestinal tract. Unlike other enteropathogenic bacteria, Salmonella frequently invades the blood stream, causing either a symptomatic or asymptomatic bacteraemia (Hook, 1990). In special circumstances, such as previous trauma or sickle cell disease, immunosuppression or in the acquired immunodeficiency syndrome, metastatic infections may result (Black *et al.*, 1960; Ortiz, 1971; Wolfe *et al.*, 1971). A remote Salmonella abscess usually develops by haematogenous or lymphatic dissemination of a primary gastrointestinal infection. Occasionally, bacteria introduced orally may infect tonsillar tissue and causes lymphadenitis (Shikani *et al.*, 1990). Most probably, a similar pathogenesis occurred in the present case and gave rise to the sepsis in the soft tissues of the neck.

The epidemiology of Salmonellosis in our region includes sporadic isolations of various serotypes of Salmonella with occasional food born outbreaks. The type isolated from this patient is not involved in this outbreak.

Salmonella consuming oxygen prepared a suitable ground for the growth of anaerobes as occurs in synergistic infection of the head and neck (Tovi *et al.*, 1991).

We are aware of 14 previously reported cases of Salmonella infection of the neck. While in four of them the thyroid gland was the site of cervical infection (Gudipati and Westblom, 1991), in the rest of the patients the suppuration occurred in the cervical soft tissues (Shikani *et al.*, 1990). These patients had underlying systemic diseases (diabetes, malignancy or hepatic disease). Internal jugular vein thrombosis was not mentioned in any of these patients. Septic thrombophlebitis of the internal jugular vein occurs as the result of a local or regional infectious inflammatory process. The significance of its systemic effects far exceeds the local implications. Lymphatic spread from an infected tonsil to the adventitia of the internal jugular vein is a well-known aetiopathogenesis in the development of thrombophlebitis (Sinave *et al.*, 1989). This usually occurs after a delay of one or two weeks from the initial pharyngeal infection and it is termed as post-anginal sepsis or Lemierre syndrome (Chowdhury *et al.*, 1990). The signs of the initial pharyngeal infection, as occurred in our patient, are commonly absent, hence the diagnosis of post-anginal sepsis may be difficult (Sinave *et al.*, 1989). The widespread use of antibiotics in pharyngeal infections had dramatically decreased the incidence of this once common entity and pulmonary complications are less frequently encountered. However sometimes the high virulence of the pathogenic organism or inappropriate antibiotic therapy facilitate the development of septic internal jugular vein thrombophlebitis. A deep neck abscess may develop together with the jugular vein thrombosis or may precipitate the septic thrombophlebitic process. However, in some of the cases thrombophlebitis of the jugular vein occurs without abscess formation.

Ultrasound is an important means of diagnosis of space occupying lesions of the neck, including abscesses (Kreutzer *et al.*, 1982). It also gives information about the patency of the major cervical vessels (Wing and Scheible, 1983). In the present case

the non-homogeneous deep neck collection together with occlusion of the internal jugular vein, as demonstrated by this technique, indicated the serious nature of the cervical infection. Prompt surgical treatment including drainage and debridement together with the appropriate antibiotic therapy resulted in complete resolution of the infectious inflammatory process and recanalization of the internal jugular vein.

Conclusion

The possibility of a Salmonella infection should be considered in patients with deep neck infections unresponsive to the antibiotics covering the routine flora of the upper aerodigestive tract. Culture confirmation of the offender is crucial in order to initiate the proper antibiotics and to prevent severe consequences.

References

- Barlett, J. G., Gorbach, S. L. (1976) Anaerobic infections of the head and neck in symposium on infections of the head and neck. *Otolaryngologic Clinics of North America*, **9**: 655–678.
- Black, I.H., Kunz, L. J., Swartz, M. N. (1960) Salmonellosis: a review of some unusual aspects. *New England Journal of Medicine*, **262**: 811–817, 864–870.
- Chowdhury, K., Bloom, J., Black, M. J., Al-Noury, K. (1990) Spontaneous and non spontaneous internal jugular vein thrombosis. *Head and Neck*, **9**: 168–173.
- Hook, E. W. (1990) Salmonella (including typhoid fever) in principles and practice of infectious disease, third edition. (Mandel, G. L., Douglas, R. G., Bennett, J. F., eds.) Churchill Livingstone: New York. p 1701–1716.
- Gudipati, S., Westblom, T. U. (1991) Salmonellosis initially seen as a thyroid abscess. *Head and Neck*, **13**: 153–155.
- Kreutzer, E. W., Jafek, B. W., Johnson, M. L., Zunkel, D. E. (1982) Ultrasonography in the preoperative evaluation of neck abscesses. *Head and Neck*, **4**: 290–295.
- Lewitt, G. H. Cervical Fasciae and deep neck infections (1976) *Otolaryngologic Clinics of North America*, **9**: 703–716.
- Ortiz-Neu, C., Marr, J. S., Cherubin, C. S. (1978) Bone and joint infection due to salmonella *Journal of Infectious Diseases*, **138**: 820–828.
- Saphra, I., Wassermann, M. (1954) Salmonellosis cholerae: A clinical and epidemiological evaluation of 329 infections identified between 1940 and 1954 in the New York Salmonella Center. *American Journal of Medical Sciences*, **228**: 525–533.
- Shikani, A. H., Shikani, L. T., Briscoe, P. B. (1990) Salmonella neck abscess. *Archives of Otolaryngology Head Neck Surgery*, **116**: 66–91.
- Sinave, C. P., Hardy, G. J., Fardy, P. W. (1989) The Lemierre syndrome: suppurative thrombophlebitis of the internal jugular vein secondary to oropharyngeal infection. *Medicine (Baltimore)*, **68**: 85–94.
- Tovi, F., Fliss, D. D., Zirkin, H. J. Necrotizing soft tissue infections in the head and neck; a clinopathological study. *Laryngoscope*, (in press).
- Wing, V., Scheible, W. (1983) Sonography of jugular vein thrombosis. *American Journal of Radiology*, **140**: 290–295.
- Wolfe, M. S., Armstrong, D., Louria, D. B., Blevins, A. (1971) Salmonellosis in patients with neoplastic disease: A review of 100 episodes at Memorial Cancer Center over a 13-year period. *Archives of Internal Medicine*, **128**: 546–554.

Address for correspondence:
 Alberto Leiberman,
 Professor and Head
 Department of Otolaryngology,
 Soroka Medical Center,
 P O Box 151,
 Beer-Sheva,
 Israel.

Key words: Salmonella paratyphi; Abscess, neck; Jugular vein, thrombosis