Case report

Bilateral deep neck space infection in the paediatric age group: a case report and review of the literature

Infezione bilaterale delle logge profonde del collo in età pediatrica: descrizione di un caso clinico e revisione della letteratura

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SUMMARY

Deep neck space infections can occur at any age but require more intimate management in the paediatric age group because of their rapidly progressive nature. Concurrent abscess in distinct neck spaces has rarely been reported in healthy children. Herewith, a rare case of bilateral neck abscess is reported in a 16-month-old female and the clinical presentation and management are discussed with a review of the literature.

KEY WORDS: Deep neck space infections • Paediatric neck abscess • Lymphadenitis • Cellulitis

INTRODUCTION

Deep neck space infections (DNSIs) are known to spread along facial planes and potential spaces of the neck. They can occur at any age but the paediatric deep neck infections require more intimate management because of their rapidly progressive nature1. Delays in diagnosis and treatment may lead to life-threatening complications. When the diagnosis of abscess is confirmed clinically or radiologically, prompt surgical drainage can prevent morbidity and mortality. Concurrent abscess in distinct neck spaces has rarely been reported in healthy children. Here a rare case of bilateral neck abscess, in a 16-month-old female, is reported and the clinical presentation and the management are discussed with a review of the literature.

Case report

A 16-month-old female presented with a 2-day history of fever, progressive left and right sided neck swelling. Physical examination showed a non-toxic appearance with low grade fever. There were bilateral firm, tender swellings located in the right parotid region and the left submandibular region measuring 3 × 2 cm and 5 × 5 cm, respectively. Limited mouth opening was inspected. Chest radiography revealed no abnormality, but the laboratory studies showed a leukocyte count of 24190/μl with neutrophil dominance and haemoglobin level of 9.7 g/dl. The sedimentation rate and C-Reactive protein (CRP) were 90 mm/h and 4.19 mg/dl, respectively. Neck ultrasound (US) identified bilateral abscess formation. In addition to adequate hydration, intravenous Ceftriaxone and Metranidazole were started immediately. There was no adequate clinical improvement under medical management within the first 48 hours. To identify the extent of the disease a contrast enhanced magnetic resonance imaging (MRI) was obtained which demonstrated a pre-auricular mass adjacent to the parotid measuring 35 × 29 mm on the right side and a submandibular mass measuring 54 × 30 mm.
on the left side. Both masses were enhanced with contrast peripher-
ally which led to suspected abscess formation. Subsequently, the patient
underwent external drainage of the abscess. Bilateral pus was encoun-
tered and the abscess diagnosis was confirmed. Fever and mass subsided
after surgery and treatment with anti-
biotics. Methicillin-sensitive Staphy-
lococcus aureus was isolated from
the pus culture. Pathologic examina-
tion was concordant with abscess.
Bilateral course of the disease led us
to search for an underlying aetio-
logy. The parents of patient denied any
systemic disease. Peripheral blood
lymphocyte subtypes and Ig A, Ig
M, Ig G, Ig E levels were within
normal limits. Serologic studies for
TORCH, EBV, hepatitis and HIV were negative. Evaluation
for tuberculosis did not show any abnormality. No
clinical evidence of an underlying immunocompromisa-
tion was detected and the patient was discharged from the
hospital with complete recovery after 2 weeks.

Discussion

DNSIs are infections in the potential spaces and facial
planes of the neck which could be lymphadenitis, cellu-
litis, necrotic node or abscess in nature. Although the
increased use of antibiotics has reduced the incidence of
DNSIs, they still remain an important clinical entity with
serious potential complications, such as airway obstruc-
tion, jugular vein thrombosis, carotid artery atheromatosis
and sepsis. Infection of the ears, nose, or throat may spread to deep neck spaces by direct
continuity or by lymphatic drainage to lymph nodes in
these spaces. The facial layers of the neck and natu-
ral defense mechanisms help to prevent spread of these
infections. However, if the infection is not ade-
quately treated, a severe lymphadenitis in the lymph nodes
draining the primary infection site or cellulitis in the soft
tissues may progress to a purulent fluid collection called
abscess. Abscesses of the neck may involve many
spaces simultaneously through the potential pathways
of extension illustrated in Figure 1. In the pre-antibiotic
era, pharyngo-tonsilitis was the most common cause of
deep neck abscesses whereas dental infection was the
second factor. With the wide-spread use of antibiotics,
the role of pharyngo-tonsilitis has declined. Among
infants and children, upper respiratory tract infections
are still a primary cause of deeper infections.

While adults often have numerous localizing signs and
symptoms, children with DNSIs tend to have a more subtle

presentation in that they are seldom able to verbalize their
symptoms or cooperate with the physical examination. The
most common signs and symptoms are a neck mass or
swelling, fever, poor oral intake and prior symptoms of an
upper respiratory infection such as rhinorrhea or cough.
Other symptoms include: neck pain, irritability, decreased
deck mobility, sore throat, upper airway obstructive symp-
toms and febrile seizures. In our case, the patient pre-

tended with bilateral soft swelling and low grade fever but
no history of preceding upper respiratory infection.

Computerized tomography (CT) scanning is the most
widely used modality for diagnosing deep space neck
infections because it is less expensive and readily avail-
able. Although CT is helpful both in determining the
presence and location of neck infections in children, it is
less helpful in differentiating abscess from lymphadenitis
and cellulitis. On the other hand, use of MRI gives im-
proved soft tissue definition without the use of radiation
but its use is limited due to the lack of availability and
cost. US also seems more effective than CT in identi-
fying abscess versus cellulitis and can be helpful to avoid
incision and drainage in cellulitis. We preferred MRI as
a diagnostic tool because of its superiority in determining
the type of soft-tissue infection.

Contemporary reports from different countries or areas
may reveal different common pathogens. Most studies
have determined the predominance of streptococcus and
Staphylococcus aureus as a causative organism although
often infections are polymicrobial. On the other hand, the
presence of anaerobes may be underestimated because of
the difficulty in culturing them. Streptococcus and normal
oropharyngeal flora were more common in retroparyngeal
and parapharyngeal abscesses because these organisms
are found in the oropharynx. Likewise, one would expect Sta-
phylococcus aureus to be more common in anterior and
posterior triangle and submandibular and submental ab-
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Abcesses because this organism is a common skin contaminant and these regions are more distant from the oropharynx. Consistent with the literature, culture of the obtained pus resulted methicillin-sensitive Staphylococcus aureus.

In a study reported by Coticchia et al., the most commonly encountered sites of abscesses in the head and neck region of paediatric patients were retropharyngeal or parapharyngeal spaces followed by anterior or posterior triangle and submandibular or submental regions, respectively. Parotid space abscess constituted only 1% of children. Retropharyngeal or parapharyngeal involvement was more common in one-year-old children, or older, whereas submandibular or submental involvement was more common in children younger than one year. However, there are different results, in different studies, in the literature regarding the distribution of abscesses among the spaces of the neck.

Multiple and recurrent abscesses are often seen in immuno-compromised and debilitated patients. The ability of infections to spread from deep neck spaces is well known anatomically and clinically. Since the spread of the infection from the parotid space to the contralateral submandibular space or vice versa is very unique, this unexpected directed led us to search for an underlying aetiology. But there was no clinical evidence of an underlying systemic disease or any immunocompromisation. According to us, subclinical extension of the infection through the retropharyngeal space to the contralateral side might have been the aetiology of this extraordinary condition. Prompt starting of treatment with broad-spectrum antibiotics might have masked the retropharyngeal abscess formation but failed to prevent the spread of the infection. Likewise, a retropharyngeal infectious focus, which had been resolved at the time of presentation, might have resulted in an infection with a bilateral course.

Treatment with antibiotics and surgical drainage with securing the airway are the mainstays of treatment. Although various studies have reported success in treating deep neck abscess medically with parenteral antibiotics, most still consider incision and drainage as the gold standard for the majority of paediatric deep neck abscesses. Because of the different causative organisms, broad-spectrum antibiotics are advocated in treating deep neck infections. Empirical parenteral antibiotics should be started before the culture results become available and then tailored to the culture results when available. Fortunately, most paediatric DNSIs are located either in the anterior or posterior tri-
angle of the neck or in the retropharyngeal area. Surgical drainage of these abscesses is usually direct and effective. Alternatively, needle aspiration can be another choice in the treatment of some abscesses. But it is less reliable and may require recurrent aspirations. Since there was no clinical improvement during intravenous antibiotic treatment, we decided to perform external incision and drainage and eventually confirmed the abscess diagnosis. The intra- and post-operative courses were uneventful.

Conclusions

Infections in the deep neck spaces may result in mortality if they are not diagnosed early and promptly. Since the recommended treatment for lymphadenitis and cellulitis is medical, differentiating this abscess from the other forms of DnSi avoids unnecessary surgical interventions. Clinical evidence with radiological evaluation provides precious information in determining the origin and extension of the disease and increases the accuracy of diagnosis. Although the anatomic relationships and pathways of extension of infections between the neck spaces are a well known entity, especially under broad-spectrum antibiotic treatment, subclinical retropharyngeal spread of the infections or retropharyngeal infectious foci which had been resolved at the time of presentation may result in unexpected involvement of distinct neck spaces.

References


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