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Management of Superficial Neck Abscesses

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Abstract

Objective: To evaluate clinical features, management options and outcomes in children with neck abscesses, with a view to correlating this data with the different causative micro-organisms, specifically mycobacteria.

Patients and Methods: A retrospective chart review of fifty-one consecutive children who were admitted with suspected superficial neck abscesses to the Unit between January 1994 and June 1999 was performed.

Results: The causative organisms were identified in 21 cases - bacteria in 13 patients, atypical mycobacteria in 6 cases, and mycobacterium tuberculosis in 2 instances. Children with atypical mycobacterial infection had a significantly longer duration of symptoms at the time of admission (mean=87 days) versus those with bacterial infection (mean=6 days). Ultrasonography was performed in 20 patients in this series, and was seen to be of value in demonstrating a collection in situations where there was doubt on clinical basis alone. The outcome was seen to be complicated in all children with mycobacterial infections - either atypical or tuberculous.

Conclusions: Neck abscesses are commonly encountered in paediatric practice. In most instances the diagnosis and treatment is straightforward, with an uncomplicated outcome. However, it is important to bear in mind that there exists a subset of abscesses caused by atypical mycobacteria, with greater risk of complications and recurrence, that needs special attention at the time of diagnosis, intervention and follow-up (JPMA 53:413; 2003).

Introduction

Cervical lymphadenopathy is commonly seen in paediatric practice. Although most neck infections resolve spontaneously or with empirical antibiotic therapy, a subset with suspected progression to suppuration are referred for surgical evaluation.

While bacterial infections continue to be responsible for a majority of subcutaneous neck abscesses, mycobacteria have been implicated in a significant proportion of infections. In particular, atypical mycobacteria (also called non-tuberculous mycobacteria - NTM), with their distinctive presentation and management have been increasingly reported as causative organisms. In this audit of children with suspected neck abscesses, we review the clinical presentation and management in correlation with the organisms isolated.

Patients and Methods

A retrospective audit of 51 consecutive children (16 years and below) admitted to the Leicester Royal Infirmary between January 1994 and June 1999 with neck swellings suggestive of superficial abscess was performed. This included children who presented to paediatric surgeons, general surgeons, paediatricians and otolaryngologists. Children with deep neck abscesses (e.g., tonsillar or peritonsillar abscesses) were excluded from this study.

The following parameters were documented and studied using a proforma: age, sex, season at onset, ethnic origin, predisposing factors, duration of symptoms, clinical presentation, location of sepsis, investigations performed and their impact on management, treatment instituted, antibiotic therapy, organisms isolated and their sensitivity patterns, outcome and follow-up. The last parameters were determined from case-notes, from general practitioners or by telephone interviews with parents. The duration of symptoms was calculated from the onset of the first symptom to surgical intervention; in those instances where surgical management was not instituted, the duration was calculated from the time of onset of symptoms to the time of admission.

No standardised protocol was in place at our institution for management of children with suspected neck abscesses, and investigations requested and treatment instituted varied depending on the admitting consultant and specialty.

Results

Out of 51 patients, 38 underwent incision and drainage of abscess, 2 underwent needle aspiration, one child had excision of inflamed lymph nodes while the remaining 10 children were treated with empirical antibiotics alone, since there was no evidence of a suppurative collection on clinical examination and/or ultrasound evaluation. In almost all (n=49) patients, empirical antibiotics had been taken for a variable duration prior to admission to hospital. Where obtained (n=33), pus was sent for gram stain and culture, and/or tissue was sent for culture and histopathology. On a combination of these tests, causative organisms were identified in 21 cases. While Staphylococcus aureus was most commonly isolated, atypical mycobacteria were second in frequency (Table 1).

The ages ranged from 2 months to 16 years (median The commonest sites of sepsis were the submandibular region, jugulodigastric nodes and posterior triangle of the neck (Table 2). The suspected collection was on the right side of the neck in 22, on the left side in 27 and in the mid-line in 2 cases.

with elevated temperature recorded on admission. The subset of six patients with atypical mycobacterial infection presented with symptoms similar to the group as a whole - swelling (n=5), erythema (n=4), tenderness (n=3) and pyrexia (n=2). One patient had cervical lymphadenopathy and another had a preceding non-specific rash. Both children with tuberculous abscesses presented with non-tender swellings. One had previously been treated for a tuberculous parotid abscess.

The mean duration of symptoms was 18 days. 41 children (80%) gave an acute history, i.e. they presented within 2 weeks of onset of symptoms, usually within the first week. Of the remaining 10 children with duration of symptoms longer than 14 days, 6 had atypical mycobacterial infection, 2 had tuberculous abscesses, there was no growth on pus culture in one and in the last instance, resolution of symptoms was achieved with empirical antibiotic therapy. The mean duration of symptoms for proven bacterial abscesses (n=13) was 6 days versus 87 days for mycobacterial infections (n=6).

A white cell count (WCC) was determined for 33 patients (65%). The mean WCC was 15.5 cells/ml. There was no significant difference in the mean WCC of patients with bacterial versus mycobacterial infections, or in those managed on antibiotic therapy versus those who underwent incision and drainage of abscesses. Ultrasound scan (USS) was performed in 20 patients (39%). In most instances, USS was performed when it was difficult to ascertain clinically if a suppurative collection was present. The findings and outcome in this group is shown in Figure.

It was possible to ascertain the outcome in 45 patients. The remaining 6 were lost to follow-up due to change in address and general practitioner. The outcome was uncomplicated in 33 instances - i.e., the neck swelling resolved completely. This included 21 patients who underwent surgical incision and drainage, with good healing of the wound and only a faint scar visible. In the remaining 12 patients, antibiotic therapy was instituted as the first line of treatment or subsequent to unsuccessful needle aspiration. In all cases, the swelling subsided with no residual erythema or skin changes. In 12 patients, outcome was complicated (Table 4). It is important to note that all 8 patients with mycobacterial infections (atypical or tuberculous) had complicated outcomes.

Discussion

Although the cervical lymphadenopathy is a common problem in the paediatric age group, a relatively small percentage present to the hospital for specialized care or surgical intervention.[1] This group includes cases where lymphadenopathy progresses to suppuration, where antibiotic therapy is unsuccessful in limiting the infection, and when there is chronicity, recurrence or complications.

Children before the age of four years seem to be more susceptible. The inability of this group to localize any organism at the site of attachment to nasal or pharyngeal epithelium may account for the usual spread of infection via lymphatics and resulting suppuration.[2] Infection of the nose and paranasal sinuses, nasopharynx, pharynx and middle ear[1] can all lead to neck abscesses. Submandibular and jugulodigastric nodes are most commonly affected; this is seen in our series and others.[1,2]

A consistent finding is the prolonged duration of symptoms in cases of non-tuberculous mycobacterial (NTM) abscesses.[1,3,4] This striking disparity in duration of symptoms for bacterial and atypical mycobacterial infection is demonstrated in our series. Thus, if at the time of presentation a prolonged history of neck swelling is elicited, especially if unresponsive to conventional methods of treatment, the clinician should have a high index of suspicion for mycobacterial infection.

Staphylococcus aureus is the organism most commonly isolated from superficial neck abscesses.[1,2,5] However, atypical mycobacteria are emerging as increasingly common pathogens.[2,6] Some studies indicate an actual increase in infection[3], where as others postulate that this may be due to a decline in tuberculosis, extended culture incubation periods[5], improved skin sensitivity testing or being associated with the loss of cross-immunity conferred by BCG vaccination.[7] Regardless, it is apparent that over the last two decades, atypical mycobacteria have been gradually replacing M. tuberculosis as the most frequent cause of extra-pulmonary mycobacterial disease in developed countries.

It is now recognized that the most common presentation of atypical mycobacterial infection is a cervico-facial mass[3,7], usually presenting as a unilateral, solitary lesion, involving the anterior cervical chain or submandibular area.[2,3] In a series by Del Baracco, NTM were implicated in 18-34% of cervical lymph node biopsies. In immunocompetent individuals, when the infection involves the cervical area, it is invariably the only site of infection.[3,8] Untreated lymph nodes may rupture through the skin causing sinus formation, which can persist for months. Healing is marked by fibrosis and scarring of the skin, which can be extensive and disfiguring.

The value of USS in confirming the presence of a suppurative collection is well documented.[2,9,10] It has many advantages: it is an inexpensive, non-invasive, readily available tool, with a sensitivity of 90-95%[2] in determining the presence of liquefaction and abscess formation. The lack of ionising radiation and the fact that it is generally well tolerated by children without the need for sedation makes USS particularly useful in paediatric practice. Additionally, it may help to determine the extent of suppurative adenopathy[2], its relationship to and displacement of major vessels and trachea. A prospective study has demonstrated the unreliability of the presence of fluctuance on clinical examination as an indicator of suppurative collection.[9] In our review, we found USS a useful aid to diagnosis when clinical findings were equivocal.

Although WCC has been advocated as part of the initial evaluation of children with suspected abscess[2], its value is debated by other authors.[1,3,4] Chest radiographs are invariably normal in patients with cervical lymphadenopathy secondary to NTM infections.[4,11] Tuberculous lymphadenopathy is associated with a positive plain radiograph in less than 50% of cases.[11] Therefore, the value of a chest x-ray in the routine work up for children with cervical lymphadenopathy is debatable.

The only way to confirm the diagnosis of NTM infection is to isolate the organism, which takes several weeks.[4] While histopathological methods can establish a likely mycobacterial diagnosis, they cannot differentiate a non-tuberculous infection from a tuberculous one.[3]

Management of acute bacterial abscesses is usually straightforward - once a suppurative collection is established, incision and drainage is performed.[2] There is a consensus regarding treatment of tuberculous lymphadenitis - anti-tuberculous therapy with excision of the affected nodes for the purpose of diagnosis or if suppuration has occurred. On the other hand, the management of atypical mycobacterial lymphadenitis or abscess is still under debate. Incision and drainage of a NTM abscess should be avoided as it may lead to a persistent draining sinus and unsightly scar formation.[3,4] Most authors agree that complete surgical excision is an essential part of the management of cervical NTM infection[1,3,4], with or without antimicrobial therapy. Excision of affected nodes is diagnostic as well as therapeutic.[3] However, problems may arise in two scenarios[3,8]: when disease has reached an advanced clinical stage and is associated with sinus formation, complete surgical excision is often impossible; and when lymph nodes in the parotid region are involved, where the risk of facial nerve damage may limit complete dissection. In both instances, a strong possibility of non-resolution or recurrence exists. In the first instance, total excision of the diseased tissue including involved skin is recommended.[3,7] Curettage[7] or aspiration[6] has been advocated in the latter case.

A greater role has been advocated for fine needle aspiration by some authors.[7,12] The advantages quoted are that it is an inexpensive and rapid procedure, which entails minimal discomfort and damage to critical structures e.g. the facial nerve, is avoided. Moreover, material can be obtained for cytology or microbiological evaluation, thus helping to differentiate between inflammatory, benign and malignant lesions with a high degree of accuracy.[7] However, a high incidence of sinus tract formation has been reported following needle aspiration of NTM lymphadenitis, especially if attempted through intact overlying skin.[4,7] Alessi and Dudley have reported good resolution with single or multiple needle aspiration of NTM abscesses in nine patients with no recurrence, fistula formation or facial nerve damage.[7] The need to resort to incision and drainage has been reported in other series.[1,4]

There is still considerable controversy as to whether anti-tuberculous drugs should be included as a definite part of therapy in cervical NTM infection.[2] Traditional anti-tuberculous therapy has been found to be ineffective in the treatment of NTM infections.[3,4,8,13] A variety of antibiotics are being restudied for treatment of atypical mycobacterial infections - new macrolides (clarithromycin, azithromycin), fluoroquinolones (ciproflocaxin), amikacin and rifabutin have been used in combination with ethambutol and rifampicin to treat difficult cases not amenable to surgery or in patients with disseminated disease with some success.[3,13,14]

With this series, we aim to highlight the presence of atypical mycobacteria as a significant causative pathogen for neck abscesses. The pre-operative assessment should be aimed at establishing the presence of suppuration and the possible pathogen that may be implicated. When evaluating a child with a neck swelling for prolonged duration that is not resolving with standard treatment, the clinician should keep in mind the possibility of atypical mycobacterial infection. Nevertheless, it is apparent that the diagnosis of an NTM infection is often a retrospective one, based on the complicated outcome.

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