

CASE REPORT

A Delayed Diagnosis of a Retropharyngeal Abscess in a 38-day-old Neonate: A Case Report and Review of the Literature

Vasilios Chalkiadakis¹, Sofia Stamataki², Theodoros Pantazopoulos³

ABSTRACT

Objectives: Retropharyngeal abscess is very rare in neonates. Its clinical presentation, severity, and management may share different characteristics when compared to young children or adults. Precise physical examination can be difficult and imaging may be required. Management of this clinical entity includes both intravenous antibiotic therapy and surgical drainage. The aim of this case report is to evaluate clinical presentation and management of retropharyngeal abscesses in neonates.

Methods: We report the case of a delayed diagnosis of a retropharyngeal abscess in a 38-day-old neonate that was admitted to the emergency department of our hospital.

Results: Interestingly, our patient had not been diagnosed at the first examination due to insidious clinical symptoms. This reminds us the importance of accurate history and detailed clinical examination. His condition deteriorated gradually. Although surgical drainage of the abscess was performed as soon as it was diagnosed, postoperative complications were not avoided.

Conclusion: A retropharyngeal abscess remains a life-threatening condition, with high mortality and morbidity. In neonates, diagnosis is challenging due to the variety of symptoms. Given the higher incidence of airway obstruction in these patients, early surgical intervention is usually essential. When complications are present, a multidisciplinary approach is required.

Keywords: Retropharyngeal abscess, Neonate, Complications.

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INTRODUCTION

Although deep neck space infections are common in pediatric population, retropharyngeal abscess is a relatively rare condition in neonates.¹ Early diagnosis is critical to prevent serious complications; however, the initial diagnosis may be delayed due to difficulties in clinical examination or poor verbal communication.² The onset of this clinical entity is usually insidious and neonates may present with different symptoms than older patients.³ In children, it may appear with upper respiratory tract symptoms, with or without fever. As the infection progresses, neck swelling, pain, decreased oral intake, and neck torticollis can be present. Stridor and difficulty of breathing may be experienced due to upper airway obstruction.⁴

A lateral neck radiograph may show impingement upon the airway, but computed tomography (CT) or magnetic resonance imaging (MRI) are the procedures of choice in order to confirm the presence of an abscess, determine its extent, and identify its relationship with the airway and the great vessels in the neck.⁵

The initial management of a deep space abscess is quite aggressive as this condition is potentially fatal. Intravenous antibiotic therapy with broad spectrum coverage is used, and in most cases surgical incision and drainage, usually through a trans-oral approach, are essential.⁶ Despite adequate treatment, complications may occur in some patients, such as mediastinitis, sepsis, internal jugular vein thrombosis, or airway obstruction. Furthermore, a small percent of patients will require repeated drainage.⁷

The aim of this study is to present the case of a 38-day-old neonate that was admitted to the emergency department of our

¹⁻³ENT Department, General Children's Hospital "AGIA SOFIA", Athens, Greece

Corresponding Author: Vasilios Chalkiadakis, ENT Department, General Children's Hospital "AGIA SOFIA", Athens, Greece, e-mail: chalkiadakis.v@gmail.com

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hospital, with neck swelling due to a retropharyngeal abscess. This serious condition had not been diagnosed at the first examination, because of the mild clinical symptoms. There is a paucity of literature on deep neck space abscesses in neonates, particularly regarding its early diagnosis and proper management of complications. Ethical approval was not required for this study because it was retrospective; all data were obtained as part of the patient's standard care.

CASE DESCRIPTION

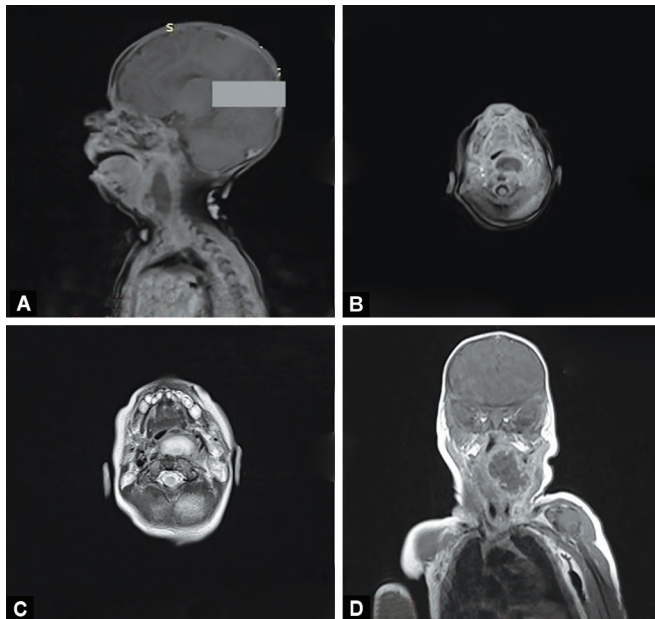
We are referring to a case of a previously well 38-day-old ex-39-week male, which was admitted to the emergency department of our hospital, due to cervical adenopathy, that was greatest on the left side of the neck. The child was born with a normal birth weight via

spontaneous vertex delivery. He is the only child and was exclusively breastfed by his mother.

According to the parents, a neck mass was firstly identified 20 days ago, with a mild head movement restriction. The neonate had no other symptoms until 6 days ago, when he presented decreased oral intake, vomiting, and fever at 38°C. There were no episodes of cough or respiratory distress. At first, he was admitted in a secondary healthcare center, where urine culture revealed a urine infection, and he was treated with cefotaxime and clindamycin. During hospitalization, neck lymphadenopathy was identified, and finally, the neonate was transferred to our tertiary care facility for further evaluation.

On clinical examination, the patient had temperature 37°C, while moderate respiratory distress and stridor were noted. His respiratory rate was 36 breaths per minute and heart rate 150 beats per minute. Torticollis was present and neck examination revealed an inflamed swelling at the left lateral aspect of the neck, without cervical lymphadenopathy. Chest X-ray was normal.

He had no trismus, so physical findings in the pharynx revealed diffuse erythema, mild dehydration and a submucosal, fluctuant, posterior pharyngeal wall lesion to the left of midline, consistent with a retropharyngeal infection. Bulging of the parapharyngeal space on the left side was also noted, with slight displacement of the uvula toward the right side. As a result, there was significant airway narrowing. The larynx could not be visualized using bedside flexible fiber-optic nasopharyngoscopy, and therefore, an MRI was scheduled. Imaging showed a 2.0 × 3.3 × 4.5 cm longitudinal retropharyngeal fluid collection, which was characterized as an abscess. Anterolateral deviation trachea to the right side with severe airway obstruction was described, because of the presence of edema in the parapharyngeal space, on the left side (Fig. 1). Furthermore, the laboratory tests were indicative of inflammation. More specific white blood cells: 22,140/μL (WBC), with neutrophil = 62%, lymphocyte = 25%, monocyte = 11% and eosinophil = 2%, platelet = 790,000/μL and C-reactive protein = 36.2 mg/L (CRP). All other parameters were within normal range.



Figs 1A to D: Sagittal, axial, and coronal sections demonstrating retropharyngeal abscess prior to drainage

Due to the size of the abscess and the obstruction of the upper airway, surgical drainage was conducted directly after baseline evaluation, without waiting for antibiotic response. It was performed by a trans-oral approach, under general anesthesia. He was intubated successfully with endoscopic aid to enhance visualization down the narrow pharynx. Firstly, the abscess was localized by aspiration. Then, the incision was placed through the posterior pharyngeal wall mucosa and the abscess was opened with blunt dissection. Totally, 9 mL of thick pus were drained intraoperatively.

The postoperative recovery was not uneventful. After surgery, the neonate presented a severe clinical deterioration with respiratory distress, tachypnea, increased work of breathing with sternal retractions, and finally was intubated and transferred at the NICU. The intravenous antibiotic therapy was changed to teicoplanin and meropenem. During the first day in NICU he experienced multiple epileptic seizures, and antiepileptic treatment with midazolam and phenobarbital was infused. The next day brain and neck MRI revealed evidence of thrombosis of the left inner jugular vein, sigmoid, and transverse sinuses. The abscess was depicted smaller with dimensions 2.2 × 1.1 × 3.8 cm. Before the initiation of anticoagulation treatment, a new surgical drainage was conducted and 1.0 mL of pus was removed. Anticoagulation due to the thrombosis included low-molecular heparin administration. According to pus culture results, *Staphylococcus aureus* was isolated, and antibiotic treatment was modulated to cefoxitin and cloxacillin. After 3 days of anticoagulation treatment the ultrasound imaging of neck vessels revealed normal flow in the left inner jugular vein. The next day he was extubated and after 3 days of steady clinical state in NICU he was transferred to the inpatient pediatric department. A bedside flexible fiber-optic exam showed no evidence of pus collection in the retropharyngeal or the parapharyngeal space.

The neurological follow-up with EEG did not demonstrate any abnormal findings and anti-epileptic treatment was stopped according to neurologists' instructions. Furthermore, the new neck MRI and brain magnetic resonance venography (MRV) 1 month after initial examination demonstrated no evidence of the abscess. Significant improvement of the blood flow in the left inner jugular venous, sigmoid, and transverse sinuses was evident, although reduced in comparison with the right side.

According to the clinical status and these imaging findings, discharge from hospital was decided. The discharge treatment included only low-molecular heparin, without any antibiotic therapy. Repeated brain and neck imaging test with MRI were scheduled 3 months after discharge. It demonstrated complete restoration of blood flow in the left venous system and anticoagulation treatment was ended. He has now been followed clinically for more than 1 year since the initial presentation. His growth parameters are within normal range, with no neurologic deficits.

DISCUSSION

Although infections in deep neck space are considered to be a rather common clinical entity in pediatric population, in neonates they appear quite rare.¹ These infections may result in accumulation of pus in one of the potential spaces of the neck, including parapharyngeal or retropharyngeal space, and create an abscess.² The abscess is termed as multispace, when two or more spaces are involved. This is not a rare condition, as the retropharyngeal space is contiguous with the parapharyngeal space bilaterally and it is bounded by the prevertebral and buccopharyngeal fascia.⁸

The retropharyngeal space contains lymph nodes that receive drainage from the posterior paranasal sinuses, the adenoids, and the nasopharynx. The formation of an abscess in this space is due to suppuration of these lymph nodes.⁹ These abscesses occur most commonly in children below 3 years old, while they are less common in patients older than 5 years old. This fact can be explained by the high incidence of upper respiratory infections in this age group, as well as due to the prominent chain of lymph nodes in the retropharyngeal space. Daya et al. concluded that younger children are more likely to develop infections in parapharyngeal or retropharyngeal space and lateral neck due to suppurative change or lymphogenous spread of infections.¹⁰

Although the incidence of deep neck space abscesses has decreased during the antibiotic era, in the last decade this trend has been reversed.⁴ The lack of awareness and primary healthcare facilities, overcrowding, low socioeconomic status, and poor hygiene can be important risk factors.¹¹ Therefore, it should be a focus for research in order to determine a more effective diagnosis and treatment. More specific, Buckley et al. in a 10-year retrospective study concluded not only that these cases are increasing but also that the majority of deep neck space abscesses are caused by tonsillitis rather than dental infection.¹² However, other studies have also reported a high rate of infection with unknown primary origin, in up to 50% of cases.¹³ This fact was accepted as the initial infection may be resolved by the time of presentation.

Presenting symptoms are not always typical in neonates and their condition tends to deteriorate gradually.³ Even though in older children clinical findings include fever, muffled voice, neck mass, drooling, and torticollis, several studies have shown that neonates appear as a diagnostic challenge, due to their immunological immaturity.¹⁴ While airway symptoms are more common, fever or lymphadenopathy may be present only in 20% of neonates with a retropharyngeal abscess.¹⁵ Moreover, an inappropriate use of antibiotics can mask the clinical presentation of these infections, making them elusive.¹³ As it was demonstrated in our case, the patient was treated with antibiotics for a urine infection. On clinical examination, he had subtle symptoms without fever or cough, and only mild respiratory distress and stridor.

In children, a lateral cervical radiograph may show impingement upon the airway, but computed tomography with contrast is the preferred diagnostic method in order to confirm the presence of an abscess in the retropharyngeal space.⁵ Because of the young age of our patient, an MRI scan was performed, in order to avoid unnecessary radiation. CT scans may fail to differentiate between cellulitis and abscess, resulting in a false-positive diagnosis. Although, MRI remains a time-consuming exam, this imaging technique not only has better definition of the soft tissue but it can also determine the extent of the abscess and identify its relationship with the airway and the great vessels in the neck.¹⁶

Aerobic organisms are predominantly isolated in pediatric patients. However, the cause of infections in this area might also be polymicrobial. The prevalent pathogens include *S. aureus*, as in our patient, group A *Streptococcus*, and oral anaerobic bacteria.¹⁷ *Haemophilus influenzae*, gram-negative enteric microbes, and *Klebsiella* species have also been reported occasionally.¹⁸ Abdel-Haq et al. showed an increased risk of MRSA in children younger than 2 years old and an association between MRSA and mediastinitis.¹⁹ Finally, no growth of bacteria may also be observed, which can be explained by the use of high doses of intravenous antibiotics before the surgical drainage of the abscess.¹³

A retropharyngeal abscess may potentially extend into neighboring structures by direct continuity or lymphatic drainage, with life-threatening complications, including airway obstruction, mediastinitis, vertebral osteomyelitis, and involvement of jugular and carotid vessels.⁷ These complications are more common when there is a delayed diagnosis or treatment. Vertical spread of infection in retropharyngeal or parapharyngeal space is considered to be rare in children, because suppurative adenitis is usually well contained within the inflammatory rind of the infected node. Extension may occur only when a suppurative node ruptures into the pharynx.¹⁷ Arterial involvement can result in hemorrhage and pseudoaneurysm, while Lemierre's syndrome (internal jugular thrombophlebitis) or transverse sinus thrombosis may also occur.^{20,21} Thrombosis of the left inner jugular vein, sigmoid, and transverse sinuses was observed in our case, and initiation of anticoagulation treatment was necessary. Interestingly, it has been demonstrated that children less than 2 years old or those with multiple abscesses tend to develop complications.¹⁵ Furthermore, Baldassari et al. and Cheng et al. reported a complication rate of 9.4 and 6.7%, respectively, in this subpopulation.^{11,22}

Treatment of retropharyngeal abscess includes airway control, effective antibiotic therapy, and surgical incision and drainage of the abscess, in order to reduce the associated morbidity and mortality.¹⁵ Nowadays, there are no specific indications for the appropriate treatment strategy, conservative or surgical, or for the duration of antibiotic treatment. In most cases, hospitalization is advised due to the potential severe complications, while the duration of treatment is individualized, according to clinical response.⁶ It has to be stated that the first treatment goal is to secure the airway. Intubation remains a challenge in these patients, because visualizing and locating of glottis may be difficult, due to the extended inflammation.¹⁸ The surgeon should be prepared to perform tracheostomy, if necessary. Besides that, direct laryngoscopy has the risk of puncturing the abscess, and consequently causing aspiration of pus into the respiratory system. In these cases, nasal intubation may be preferred.²³

Treatment strategies for the management of deep neck space infections still remain controversial, and an individualized approach is frequently suggested.²⁴ In young children with small abscesses, and no or minimal symptoms, a more conservative approach is recommended, at least for the first 48 hours.²⁵ Regarding empirical antibiotic treatment, third-generation cephalosporin with ampicillin-sulbactam or clindamycin is proposed, as soon as the diagnosis has been made.¹⁸ This may be later altered according to the pus culture sensitivity report, if necessary. The exact duration of antibiotic therapy is not known, but several days of intravenous antibiotic therapy followed by a course of oral antibiotics is usually essential.¹⁸

Surgical drainage should be preferred in neonates, in large and/or symptomatic abscesses (usually above 2 cm), and in cases that do not respond to antibiotic treatment alone.²⁶ Incision and drainage procedures are usually performed the same or the next day of admission.¹⁶ In our case, the patient had a relatively large abscess that provoked obstruction of the upper airway, and therefore, surgical drainage was conducted directly after baseline evaluation. A trans-oral approach is effective in most retropharyngeal and parapharyngeal abscesses (93 and 92%, respectively).¹⁶ Furthermore, trans-oral approach has the advantages of shorter hospital stay and less hospital costs, while neurovascular injuries can be avoided.²⁶ Occasionally, a combination of transoral and external approach may prove necessary in case of a multicompartiment collection.²⁷ Woods

et al. reported that surgical drainage was performed in almost half of the children with parapharyngeal (58.1%), and retropharyngeal abscess (46.7%). These findings suggest that patients with parapharyngeal or retropharyngeal abscesses may be managed safely without surgical drainage.²⁸ Nevertheless, given the higher incidence of airway symptoms in neonates, surgical drainage of the abscess may be prudent. Complementary symptomatic treatment is also administered, including analgesics, antipyretics, and fluid therapy.

CONCLUSION

Clinical presentation, severity, and management of retropharyngeal abscess may share different characteristics in children when compared to adults. In pediatric population, lymphadenitis and upper respiratory tract infection are the main causes of this entity. Moreover, neonates, whose physical examination can be very difficult, tend to have subtle clinical signs and symptoms, which often overlap with those of other common infections. The case presented here was not diagnosed at the first examination, and it reminds us the clinical value of precise physical examination and thorough history of the patient.

Retropharyngeal abscesses continue to cause significant mortality and morbidity rates, despite improvements in diagnosis and treatment, conservative or surgical. Early surgical intervention is necessary, given the higher incidence of airway issues in neonates. In case of neurologic deficits or prolonged recovery, further investigation with imaging techniques, such as MRI and MRV, is required. Finally, neonates that are prone to complications should be early identified in order to receive the appropriate management. Multidisciplinary approach by various specialized clinicians, including pediatricians, otorhinolaryngologists, infectious disease specialists and neurosurgeons, is frequently necessary.

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