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Needle aspiration as primary surgical treatment of pediatric deep neck space abscesses

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ABSTRACT

Objective: Examination of the outcomes of needle aspiration (NA) under sedation as the primary surgical treatment for pediatric deep neck space abscesses (DNSA) to determine its adequacy, safety, and cost.
Study design: Retrospective chart review.
Methods: 10 consecutive pediatric patients (age 4–48 months) that were diagnosed with DNSA starting from August 2008 through October 2015 were included in our review. All patients were on antibiotics and were treated with NA as the primary surgical treatment modality. Procedures were all performed in our pediatric sedation suite. We have examined our outcomes including need to convert to open incision and drainage (I&D), number of aspirations required, hospital stay, if purulence obtained, culture results, and imaging modality used. We also compared our results with previous studies using incision and drainage as the primary treatment modality focusing on the duration of their hospital stay.
Results: None of our 10 patients required an open I&D. Two of 10 (20%) did require repeat aspiration once with no patient requiring more than two aspirations. Median hospital stay was 4 days (range 3–8).
Conclusion: In our small study group NA performed under sedation was an effective treatment modality with duration of hospital stay comparable to other studies that included treatment with I&D under general anesthesia.

1. Introduction

Pediatric DNSA are serious infections that can result in significant morbidity as well as mortality. Etiology is diverse including spreading infections from the tonsils, pharynx, skin, sinuses, middle ear, and mastoid, in addition to congenital anomalies as well as traumatic or surgical wounds. The most common causative organisms are methicillin-sensitive *Staphylococcus aureus* (MSSA), methicillin-resistant *Staphylococcus aureus* (MRSA), group A beta hemolytic Streptococcus (GABHS) with a small minority of other organisms [1,2]. The use of antibiotics in the modern era has greatly decreased the incidence of abscesses but has led to increasing rates of antibiotic resistance [1,2]. Traditional treatment of an abscess includes I&D under general anesthesia with accompanying morbidity of a surgical procedure and an open, draining wound as well as a scar on a child's neck. Because of these considerations more conservative treatment options are explored in selected cases [3–5]. Our study evaluates the success rate of our needle aspiration (NA) protocol. NA helps obtain cultures, provide adequate drainage of the abscess, avoid the morbidity of an open wound (superinfection, dressing and packing changes, isolation etc.). There is also concern for injury to major vessels caused by blind NA with large sharp needles. Other studies using NA reported adequate drainage with good results and low rates of complications in patients that fail to respond to medical management [6–7]. Despite this, in our opinion, most guidelines fail to report this technique adequately and make no favorable recommendations on NA. The aim of this study was to examine our institutions' experience of the effectiveness and safety of NA as the primary surgical modality combined with antibiotic treatment. We compared the length of hospital stay and cost effectiveness with NA to a prior study using I&D as the primary surgical modality [8].

2. Materials and methods

IRB approval for a retrospective chart review was obtained. 10 consecutive pediatric patients who were treated with NA as the primary surgical modality and meet criteria were identified. All were performed under conscious sedation at the LSU Health Shreveport pediatric sedation suite from August 2008 through October 2015. Patients with atypical mycobacteria on culture were excluded. Data collected include Age, Sex, Number of Procedures, Hospital Stay, Need for Ultimate I&D, Cultures, Imaging Obtained, Purulence Obtained. It has been our practice to perform aspiration on patients if they have fluctuation on

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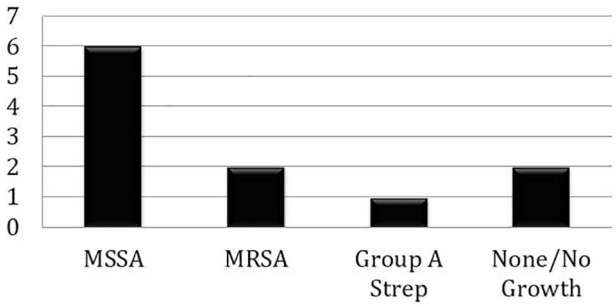
Fig. 1. Example CT scan of neck abscess.

physical exam or fluid collection noted on imaging. We typically opt for ultrasound however many patients had CT scans performed prior to ENT consultation. Procedure is performed through an 18G angiocatheter introduced through the skin with the sharp trocar in place: as soon as through the skin and immediate subcutaneous layers are breached, the metallic sharp trocar is removed and a 10 cc syringe is attached to the soft plastic catheter. The aspiration is continued in several directions and depths of the abscess (mass) while constant suction (negative pressure) is applied through the syringe/plunger. 3–4 skin punctures are made in different parts repeating the exchange of sharp trocar and application of suction until purulence is obtained. The soft catheter is carefully introduced into tissue to enter and connect various multilocular cystic areas of the abscess (Fig. 1).

3. Results

Demographic data and explored parameters are displayed in Table 1. Age range is 4–48 months with median age of 15.5 months. Purulence was obtained in 9/10 (90%) of patients. Cultures were successful in 8/10 (80%) patients. Culture results are depicted in Graph 1. The frequency of MSSA, MRSA and group a strep was similar to frequencies from prior studies [1,2]. No patient (0/10) required subsequent incision and drainage due to failure of NA. Only 2 out of 10 (20%) patients required repeat aspiration, no patient required more than 2 NA's. Median hospital stay was 4 days, (range 3–8) (mean 4.2).



Graph 1. Culture results.

As a control group to represent incision and drainage we compared our hospital stay to a prior study, The Public Health Impact of Pediatric Deep Neck Space Infections. Adil, E et al. compared hospital stay in patients that underwent I&D versus medical management for deep neck space abscesses. Their mean hospital stay for incision and drainage was 4.19 days compared to 3.44 days mean for medical management. None of our patients developed a hematoma or other complication due to NA (Graph 1).

4. Discussion

Our results confirm NA as an effective and safe primary surgical treatment for pediatric patients with DNSA. Despite concern for inadequate drainage with aspiration, none of our patients had to undergo incision and drainage for resolution of infection. Only 2 out of 10 had a second NA. This is consistent with findings from prior studies [6–7]. Although our sample size is small, avoidance of the OR and general anesthesia does significantly reduce cost compared to traditional methods of I&D [9]. Cost effectiveness through a shorter hospital stay is difficult to show with the limited size of our sample. This study provides more evidence that NA can be used safely without the morbidity of General Anesthetics and I&D. NA efficiency is so persuasive that the senior author (AG) has used NA exclusively in the past 10 years of his academic pediatric ENT practice.

5. Conclusion

NA is a safe and effective primary surgical treatment modality, providing a better alternative to I&D. NA provides cost effectiveness, safety, reduced morbidity and a hospital stay comparable to treatment with incision and drainage under general anesthesia.

Table 1
Patient information.

Age (months)	Sex	Imaging	Purulence	Need for ultimate I&D	Hospital stay (days)	Culture
24	Female	CT scan	Y	No	5	MRSA
4	Male	CT scan, US	Y	No	8	MSSA
36	Male	CT scan	Y	No	?	MRSA
9	Female	US	Y	No	4	MSSA
14	Female	US	Y	No	4	MSSA
48	Male	CT scan	Y	No	4	No growth
36	Male	US	Y	No	3	Group A strep
14	Male	CT scan	Y	No	4	MSSA
17	Female	None	N	No	3	None
8	Male	US	Y	No	3	MSSA

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The authors have no financial disclosures to declare.

Declaration of competing interest

The authors have no conflicting interests to declare.

References

[1] Thomason TS, Brenski A, McClay J, Ehmer D. The rising incidence of methicillin-resistant *Staphylococcus aureus* in pediatric neck abscesses. Otolaryngol Head Neck Surg 2007;137:459–64.
[2] Inman JC, Rowe M, Ghostine M, Fleck T. Pediatric neck abscesses—changing organisms and empiric therapies. Laryngoscope 2008;118:2111–4. https://doi.org/10.1097/MLG.0b013e318182a4fb.
[3] Bolton M, Wang W, Hahn A, Ramilo O, Mejias A, Jaggi P. Predictors for successful treatment of pediatric deep neck infections using antimicrobials alone. Pediatr Infect Dis J 2013;32(9):1034–6. https://doi.org/10.1097/INF.0b013e31829331f2.
[4] Sichel JY, Dano I, Hocwald E, Biron A, Eliashar R. Nonsurgical management of parapharyngeal space infections: a prospective study. Laryngoscope. 2002;112:906–10.
[5] Craig FW, Schunk JE. Retropharyngeal abscess in children: clinical presentation, utility of imaging, and current management. Pediatrics. 2003;111:1394–8.
[6] Broughton RA. Nonsurgical management of deep neck infections in children. Pediatr Infect Dis J 1992;11:14–8.
[7] Serour F, Gorenstein A, Somekh E. Needle aspiration for suppurative cervical lymphadenitis. Clin Pediatr (Phila) 2002;41:471–4.
[8] Baek MY, Park KH, We JH, Park SE. Needle aspiration as therapeutic management for suppurative cervical lymphadenitis in children. Korean J Pediatr 2010;53(8):801–4. https://doi.org/10.3345/kjp.2010.53.8.801.
[9] Adil E, Tarshish Y, Roberson D. The public health impact of pediatric deep neck space infections. Otolaryngol Head Neck Surg 2015;153:1036–41.