O papel do tratamento conservador nas infeções cervicais profundas pediátricas

The value of conservative management in pediatric deep neck space infections

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RESUMO

Objetivo: Avaliar o papel do tratamento conservador nas infeções cervicais profundas pediátricas.

Desenho do estudo: Estudo retrospetivo.

Material e Métodos: Incluímos doentes pediátricos com evidência imagiológica de infeção parafaríngea e retrofaríngea, admitidos na nossa instituição entre janeiro de 2007 e dezembro de 2017. A análise estatística foi realizada no IBM SPSS versão 24.

Resultados e Conclusões: Incluímos 33 doentes com idade mediana de 4 anos (1-15), 16 (48%) do sexo masculino. Dezassete (52%) foram submetidos a cirurgia e dezasseis (48%) receberam tratamento conservador. Não verificámos diferenças relativamente à idade, antibioterapia e utilização de corticoides sistémicos.

O grupo submetido a tratamento conservador apresentava abcessos menores (16.4 vs 24.1 mm, p=0.04), e internamentos mais curtos (9 vs 11 dias, p=0.06).

Não houve recorrências em ambos os grupos.

O tratamento conservador foi eficaz em doente com abcessos de menores dimensões, no entanto, são necessários estudos com amostras maiores para validar os nossos resultados.

Palavras chave: abcesso retrofaríngeo; pescoço; abcesso; fáscia.

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ABSTRACT

Objective: To evaluate the role of medical treatment in pediatric deep neck space infection management.

Study design: Retrospective study.

Material & Methods: Pediatric patients with imagiologic evidence of parapharyngeal or retropharyngeal infection admitted to our institution between January 2007 and December 2017 were included. Statistical analysis was conducted in IBM SPSS version 24.

Results and Conclusions: A total of 33 patients were included. Median age was 4 years (1-15) and 16 (48%) were male. Seventeen (52%) patients had surgical treatment and sixteen (48%) were managed with antibiotics alone.

We observed no differences between the two groups regarding age, antibiotic regimen and steroids use.

The conservative group had smaller abscesses (16.4 vs 24.1 mm, p=0.04), and shorter inpatient admission (9 days vs 11 days, p=0.06).

There were no recurrences in both groups.

Conservative treatment was effective in selected patients with smaller abscesses. Further studies with larger samples would be important.

Keywords: retropharyngeal abscess; neck; abscess; fascia.

INTRODUCTION

Deep neck space infections (DNIs) are a heterogeneous group of disorders affecting the cervical fascia layers and potential spaces of the neck. These include distinct clinical entities ranging from cellulitis (infection of the cellular adipose tissue located in the aponeurotic spaces) to abscess collection (the presence of pus within a potential space)[1-3].

The incidence of these disorders increased in the last years and its socioeconomic impact remain significant[4,5].

In the pediatric population, the parapharyngeal and retropharyngeal spaces are the most commonly affected locations, either as a result of direct spread or most commonly due to suppurative change of lymphatic nodes[4,6-8].

While pediatric DNIs are more frequently contained within the lymphatics and less likely to spread along fascial compartments than the adult counterparts, these conditions may course with life-threatening

situations, such as airway obstruction, descending necrotizing mediastinitis, septic shock, pleural effusion, pericardial effusion, cranial nerve palsy, and vascular complications. In children, the clinical presentation with non-specific symptoms and the inability to cooperate with the examination may lead to diagnosis delay and further complications[9-12].

While surgical drainage has been the mainstay of treatment, the optimal management of these conditions remains controversial, with several authors advocating an initial trial of medical therapy in clinically stable children[2,6,10,12-14].

Though several reports provide evidence for the safety and efficacy of medical treatment of pediatric DNIs on selected patients, the optimal candidates for this approach are not well established[15,16].

The aim of our study was to evaluate the value of conservative management of DNIs in the pediatric population and identify factors associated with successful non-surgical treatment.

MATERIAL AND METHODS

We conducted a retrospective study with chart review.

All pediatric inpatient files were screened for DNI cases, between January 2007 and December 2017. Inclusion criteria were all patients with 16 years or less, admitted for longer than three days with imagiologic evidence of parapharyngeal or retropharyngeal space infection. Patients with incomplete charts, without available imaging, confined peritonsillar infections, or DNI affecting other spaces were excluded.

We collected data regarding relevant medical history, symptoms, physical findings, laboratory results and imagiologic workup, treatment, and clinical response. If a surgical procedure was performed, the findings were also reported.

Statistical analysis was conducted on IBM SPSS version 24. Categorical data was analyzed using a chi-square test and continuous data using an independent t-test. Results are presented as median (minimum-maximum). Statistical significance was considered for p values below 0.05.

DNIs were coded as cellulitis or abscess according to the cervical contrast-enhanced CT findings. The former had diffuse inflammatory findings, while rim-enhancement or the presence of air-fluid level were diagnostic of abscess.

The parapharyngeal space lies lateral to the pharynx, limited posteriorly by the prevertebral fascia, anteriorly by the pterygomandibular raphe, laterally by the fascia covering the inner surface of the masticator space, the skull base superiorly and hyoid bone inferiorly. The retropharyngeal space lies between the buccopharyngeal fascia anteriorly and the alar fascia posteriorly.

RESULTS

Forty-one patients were identified, 33 met the inclusion criteria and eight were excluded. Reasons for exclusion included incomplete data (two) and infection not affecting the parapharyngeal or retropharyngeal spaces (six). A total of 33 patients were included in this study, 16 (48%) males and 17 (52%) females. The median age was 4 years (1-15) and 75.8% (n=25) occurred in children under the age of six.

Five (15.2%) patients had deep neck space cellulitis and 28 (84.8%) cases had a deep neck space abscess.

The parapharyngeal space was affected in 14 (42.4%) cases, the retropharyngeal space in 13 (39.4%) cases and 6 (18.2%) patients had both spaces affected.

The most frequently reported symptoms included fever (25, 75.8%), food refusal (12, 36.4%), sore throat (9, 27.3%), neck pain (15, 45.5%), otalgia (4, 12.1%) and dysphagia (1, 3%). The most common recorded signs were torticollis (17, 51.5%), neck swelling (14, 42.4%) and trismus (1, 3%). Symptoms were more commonly present for 2 days (1-20) prior to admission and in 18 (54.5%) children the neck infection was preceded by an upper airway infection.

Twenty cases (60.6%) were treated with a cephalosporin associated with clindamycin, and 9 (27.3%) received amoxicillin/clavulanic acid. Nine patients had systemic steroids as part of the therapeutic management, 18.8% in the conservative group versus 35.3% in the surgical group, p=0.44.

Seventeen children were managed with surgery and 16 children were managed with antibiotics and observation (table 1). In the latter group, 12 patients had abscesses and 4 had cellulitis. One patient with parapharyngeal cellulitis had surgical drainage of a peritonsillar abscess. Surgical intervention occurred on the second day of admission, in a median.

While the imagiologic diagnosis of an abscess was similar in both groups (93.8% vs 75%, p= 0.33), abscesses in the surgical group were larger (24.1 mm vs 16.4 mm, p=0.022). Abscess size varied between 12 mm and 37 mm for surgical patients, and conservative treatment was effective in abscesses up to 24 mm.

We observed no differences between the two groups regarding demographic, antibiotic regimen and steroids use. Symptom duration (4.2 days vs 3.5 days) and C reactive protein values (8.8 mg/dl vs 6.9 mg/dl, p=0.3) were also similar.

The median hospital stay was 9 days (3-20) for all patients. We observed a tendency for shorter inpatient admission in the conservative treatment group (8.5 days vs 11 days, p=0.07).

No mortality or recurrences were observed in both groups. We observed one case of transient Horner syndrome following surgery, with full recovery after one month.

In five patients diagnosed with an abscess, the surgical findings were negative for pus collection. All these

TABLE 1
Differences between patients treated with surgery and patients receiving conservative treatment (n = 33).

Characteristics	Surgical (n=17)	Conservative (n=16)	P value
Age (years; range)	6 (1-15)	4.5 (1-10)	0.27
Male/female (nr.; %)	8/9; 24.2/27.3	9/7; 27.3/21.2	0.42
Parapharyngeal/retropharyngeal (nr.; %)*	8/5; 30.8/19.2	5/8; 19.2/30.8	0.22
Symptomatic course (days; range)	4.2 (1-20)	3.5 (1-15)	0.15
Abscess size (mm; range)	24.1 (12-37)	16.4 (up to 24)	0.022
Lengh of stay (days; range)	11 (5-20)	8.5 (4-14)	0.07
CRP levels (mg/dl)	8.8	6.9	0.3

cases were drained on the first day of admission and symptoms were present for a median of one day (vs 2 days in the cases with positive surgical findings, p=0.3). There were no differences in abscess location or size (27 mm vs 25 mm, p=0.6) and the C reactive protein values were similar (10.5 mg/dL vs 8.8 mg/dL, p=0.9) among children presenting negative surgical findings or pus drainage, respectively.

DISCUSSION

Pediatric DNIs are not very common but may cause serious complications. While previous studies report rates of airway obstruction as high as 30%, with an increased risk in younger children, in our cases no complications were reported[10,17].

In this study, we found that patients who had smaller abscesses as evidenced by CT scan were less likely to be treated with surgery. This finding is consistent with our common practice of active surveillance for abscesses up to 20 mm, in healthy and medical stable patients. Our results are also in accordance with previous reports who found abscess size as the most common predictor of medical therapy failure. While this factor is consistently reported in the literature, there is considerable variation in the reported size cutoff, with authors recommending surgical intervention for abscess size ranging from less than 1 cm to 2.5 cm[10,12,17-19]. In our study, however, despite that surgery was performed, in a median, on the second day of admission, the decision to undergo surgical treatment could have been made sooner. Factors like being admitted at other health care facility, or operative theatre availability could account for a small delay between the decision to undergo surgery and its timing. As a result, these patients should not be regarded as conservative treatment failure.

Other risk factors reported in the literature included younger age and intensive care admission[10]. A recent literature review performed by Lawrence and Bateman identified several factors associated with increased need of surgery, that included: signs of airway compromise, presence of complications, no clinical improvement after 48 h of intravenous antibiotherapy, abscess >2.2 cm on CT imaging, age <4 years and intensive care admission[20].

In our study, there were no cases presenting life-threatening complications and none needed intensive care admission. Children who had surgery were, in fact, older than those who underwent conservative treatment, though this difference was non-significant. We did not find significant differences related to the presence of cellulitis, abscess size or location between older and younger children.

According to the literature, most DNIs cases occur in children under 6 years old. This was also evident in our study, although we did not observe an increased proportion of males as previously stated by some studies[21,22].

Hospital stays reported are also variable, with studies reporting a median length time of fewer than three days to more than 10 days[5,14].

In our study, we observed a non-significant increase in the length of stay for surgically treated patients. While some authors report similar findings[10,18], other authors did not find differences between both groups[12]. The inclusion of peritonsillar abscesses in some series may account for this variation.

We also observed a high rate of negative surgical findings among children diagnosed with an abscess based on CT scan findings. All of these children had surgery on the first day of admission and the symptomatic course was non-significantly shorter when compared with children with pus drainage. Our rate of negative surgical drainage was higher than the rates reported by Flanary et al. In this study, the authors reported a negative surgical drainage in 2 of 10 children diagnosed with abscess by CT scan[17].

CT scan is currently the method of choice to diagnose a DNI but distinguishing cellulitis from abscesses may be difficult. In fact, necrotic lymph nodes may mimic pus collection and have been pointed as an explanation for false positive findings. According to the literature, CT scan positive predictive value for abscess diagnosis ranges from 50% to 100%[2,23-25].

Surgical management of DNI in children was

traditionally the mainstay of treatment. However, the morbidity associated with this approach, including the need for anesthesia, and the risk of complications such as neurovascular injury must be considered. Conservative management with high dose antibiotics offers an alternative option in medical stable children, with absent comorbid conditions and abscesses up to 24 mm while avoiding iatrogenic injury to cranial nerves and vascular structures of the neck, whose complex anatomy represents a greater challenge in the pediatric patient. A concern regarding this option is the potential overestimation of treatment efficacy when treating larger abscesses, considering the diagnostic inaccuracy of imaging studies in some cases. Also, there is a possible biofilm role in larger abscesses that may account for medical treatment failure and recurrence. In a review of 14 patients with deep neck space abscesses, May et al. found evidence of biofilm architecture on electron micrography in 12. The clinical importance of these findings remains unknown[10,26].

Though the benefits and risk of each approach must be carefully weighed, the incidence of complications in conservative treatment series is low, when used in selected cases.

Overall, DNIs are not frequent in the pediatric population, and current data supporting an initial trial of medical therapy relies mostly on retrospective studies presenting a small number of cases. According to a meta-analysis, currently, the overall level of evidence for this approach lacks strength and supporting data is limited[15].

Our study provides an overview of our experience with pediatric DNI over the last decade. Some limitations include its unicentric nature and the small number of cases, which may not represent the average child with DNI. We must emphasize that none of these cases had life-threatening complications or needed intensive care admission. This fact also highlights the importance of early management and close monitoring of DNIs in order to prevent complications. Reporting biases and coding differences are also limitations inherent to retrospective data collection.

CONCLUSION

Our study supports a role for conservative treatment in otherwise healthy children, who are clinically stable, presenting with DNI abscesses up to 24 mm. Further studies with larger samples would be important to validate our results.

Conflict of Interest

The authors declare that they have no competing interests.

Data Confidentiality

This study is in accordance with the ethics standards of the institute where it was carried out.

Compliance with ethical standards

The authors state that this study was performed in accordance with the ethical standards of the Declaration of Helsinki. This study was approved by Vila Nova de Gaia/Espinho Hospital Centre Ethical Committee.

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