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Risk factors for transcervical incision and drainage of pediatric deep neck infections

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ABSTRACT

Objectives: The aim of this study was to identify risk factors for transcervical approaches in the treatment of pediatric deep neck infections (DNIs).
Methods: We performed a retrospective analysis of data from patients who were diagnosed with DNIs. All medical records were reviewed for demographic characteristics, presenting signs and symptoms, duration of symptoms, size of abscess, laboratory results, duration of intravenous (IV) antibiotic administration, duration of hospitalization, medical treatment, and type of surgical drainage (oral or transcervical approach). We divided 126 patients into three groups according to the approach used to treat the DNI: non-surgical, intraoral surgical and external transcervical surgical.
Results: The average ages of the non-surgical, intraoral, and transcervical groups were 10.46 ± 5.27, 12.75 ± 4.82 and 5.54 ± 5.15 years, respectively. The transcervical approach was used to treat younger patients ($p < 0.001$). Abscess size was significantly larger for the transcervical group compared to the other groups (5.72 ± 8.93, 13.51 ± 14.74, 18.36 ± 16.05 mm, non-surgical, intraoral, and transcervical group, respectively, $p = 0.009$). The average duration of IV antibiotic administration for the transcervical group was 9.77 ± 3.27 days, which was significantly higher than those for the other groups (5.49 ± 3.28 for non-surgical and 6.13 ± 2.85 for intraoral, $p < 0.001$). Multivariate analysis revealed that submandibular abscesses (Exp (B) = 5.254, $p = 0.012$) were the only significant risk factor for the transcervical approach in surgical treatment of DNIs.
Conclusion: Submandibular space abscesses were the only significant risk factor for the transcervical approach in the treatment of pediatric DNI patients.
Level of evidence: III

Deep neck infections (DNIs) are a group of diseases localized in the deep fascia-enclosed potential spaces of the neck [1]. Complications of DNIs, such as a deep space neck abscess, retropharyngeal abscess, or parapharyngeal abscess could be potentially life-threatening and lead to descending necrotizing mediastinitis, septic shock, pleural effusion, pericardial effusion, internal jugular vein thrombosis, cavernous sinus thrombosis, or carotid artery erosion [2,3].

Pediatric DNIs tend to be contained in lymph nodes long before they spread into facial planes in the neck, therefore they are more commonly contained and less diffuse than in adults. However, due to their life-threatening complications, DNIs require fast and accurate treatments. Various localizing signs and symptoms are present in adults with DNIs, however, children tend to have more difficulty in verbalizing their symptoms and cooperating with physical examinations for diagnosis [4]. Choice of appropriate treatment approaches is critical, especially for children who are at a greater risk for complications than adults and have difficulty in describing their symptoms.

There is no consensus on the best management and treatment of DNIs [5–7]. One study showed that some patients can be treated with intravenous (IV) antibiotic therapy alone and do not require surgical drainage [8]. Nevertheless, surgical approaches have been generally used as a primary treatment. Surgical treatments can be divided into the intraoral approach and the external transcervical approach. The external transcervical approach is more complicated for children than for adults due to difficulties in wound management and scar formation after the surgery. However, the risk factors for this approach are unknown. Therefore, the aim of this study was to identify the risk factors for the transcervical approach in surgical treatment of pediatric DNIs.

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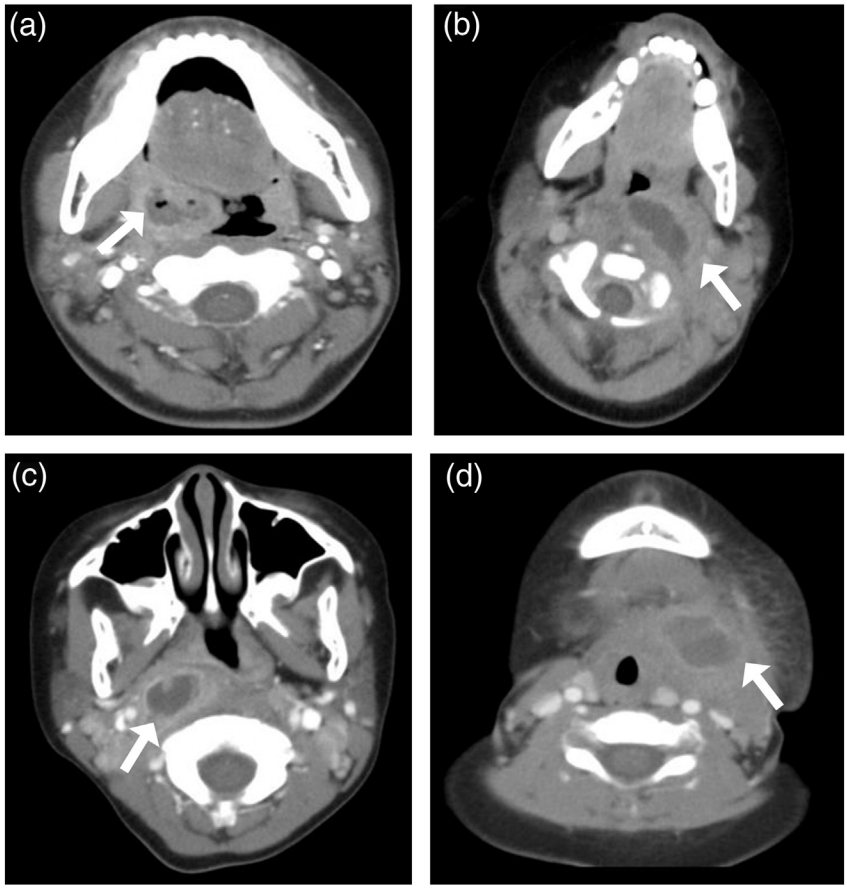

Fig. 1. Axial computed tomography view of deep neck abscess. (a) CT scan demonstrates right peritonsillar abscess with mucosal swelling (white arrow). (b) Parapharyngeal abscess. Left peritonsillar abscess extended to parapharyngeal space (white arrow) and a mass effect on the airway. (c) Retropharyngeal abscess. Right retropharyngeal space 25 × 16 mm sized low attenuated lesion with peripheral wall enhancement and surrounding soft tissue swelling (white arrow). (d) Submandibular abscess. About 22 × 16 mm sized abscess extended to left submandibular space with myositis and cellulitis (white arrow).

1. Material and methods

1.1. Material and methods

Medical records of patients aged 0–18 years who were diagnosed with deep neck infection between January 1995 and December 2015 were retrospectively reviewed. All patients underwent a comprehensive diagnostic procedure including medical history taking and physical, laboratory, and radiologic examinations. DNIs were defined as infections involving the deep neck spaces, and diagnoses were based on clinical and/or radiology results, such as contrast-enhanced computed tomography (CT) scans. DNIs were divided into peritonsillar abscess, retropharyngeal and parapharyngeal abscess, submandibular abscess and anterior and posterior cervical space abscess [1]. Surgical treatment was usually performed when airway compromise was a threat from abscess and the patient did not respond to antibiotics for more than 48 h.

All medical records were reviewed for demographic characteristics, presenting signs and symptoms, duration of symptoms, size of abscess, laboratory results, duration of IV antibiotic administration, duration of hospitalization, medical treatment, and type of surgical drainage (oral or external approach).

Patients were divided into three groups according to the type of approach used for treatment: non-surgical, intraoral approach, and external transcervical approach.

1.2. Categorization of involved space

We defined the peritonsillar abscess as the presence of an abscess pocket in peritonsillar space, which exists between the palatine tonsil and oropharyngeal wall and as the case where it did not extend to the parapharyngeal space (Fig. 1). Parapharyngeal abscess was defined as the presence of the pocket in parapharyngeal space. Parapharyngeal space is anteriorly bordered by the pterygomandibular raphe, inferiorly styloglossus muscle inferiorly, laterally the fascia covering the inner surface of the masticator space originating from superficial layer of deep cervical fascia, posteriorly the carotid sheath. Retropharyngeal abscess was defined as the presence of an abscess pocket in retropharyngeal space, which exists medial than parapharyngeal space bounded by cloison sagittale. Submandibular abscess was defined as an abscess in submandibular space, which lies between mylohyoid muscle and the skin.

1.3. Statistical analysis

Statistical analyses were performed using SPSS version 18.0 for Windows (SPSS, Chicago, IL). Categorical data were analyzed using a chi-square test and continuous data using an independent t test. Logistic regression analysis was used to identify variables independently correlated with the transcervical approach. Results are presented as mean ± SD. p Values <.05 were considered statistically significant. In multivariate models, the odds ratio (OR) and its confidence interval were calculated.

2. Result

A total of 126 patients (65 boys, 61 girls) were included in this study, and were divided into a non-surgical group (20 boys and 17 girls), an intraoral group (40 boys and 36 girls), and a transcervical group (5 boys and 8 girls). There was no significant difference between genders