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Retropharyngeal infections in children. Treatment strategies and outcomes

C. Hoffmann, S. Pierrot, P. Contencin, M-P. Morisseau-Durand, Y. Manach, V. Couloigner *

Pediatric ENT Department, Hôpital Necker – Enfants Malades, AP-HP, University of Paris V, France

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ABSTRACT

Objective: To optimize the treatment of retropharyngeal infections in children.
Methods: Retrospective chart review of 101 consecutive pediatric cases of retropharyngeal infections referred to our center from January 2006 to July 2009.
Results: Two-thirds of patients were males. Their mean age was 52 months (range: 6–163). Upper airway obstruction was observed in three patients. In another child, the infection evolved towards a diffuse cervical cellulitis. Medical treatment was initially planned in 44% of patients. Failures requiring surgical drainage occurred in 18% of them. In 56% of cases, surgical treatment was immediately instigated. It failed in 16% of patients, requiring a second surgical drainage. There was no difference in the duration of fever and of hospital stay between patients initially treated medically or surgically. Both medical and surgical treatment failures were associated with longer durations of fever ($p = 0.002$, and $p < 0.0001$, respectively) and of hospital stay ($p = 0.0006$, and $p = 0.0005$, respectively). Some characteristics of CT-scan anomalies were correlated with treatment failure. A hypodense core surrounded by rim enhancement, with a largest long axis $\geq$20 mm, was more frequent in case of medical failure ($p = 0.02$). Surgical failure was associated with the same feature, but with a largest long axis $\geq$30 mm ($p = 0.05$).
Conclusions: The present study suggests that severe complications are rare in pediatric retropharyngeal adenitis, and that CT-scan is a useful tool to choose between medical and surgical treatment.

1. Introduction

Retropharyngeal infections in children are rare complications of upper respiratory tract infections. They consist of adenitis localized behind the posterior pharyngeal wall, or posterior and lateral to it, in the so-called posterior compartment of the parapharyngeal space [1]. Their course is usually uneventful [2] but complications might be encountered such as airway obstruction, cervical necrotizing fasciitis, mediastinitis, aspiration pneumonia, jugular thrombosis or aneurysm of the carotid artery [3].

Their management is still today a subject of debate, and particularly the choice between first line medical or surgical treatment. The aim of this study was to identify the risk factors and the consequences of treatment failures, in order to define an optimal protocol.

2. Materials and methods

2.1. Patients

This retrospective chart review comprised of 101 consecutive pediatric cases of retropharyngeal infections referred to our center from January 2006 to July 2009. CT Scan confirmed diagnosis in all but one case (major dyspnea requiring urgent surgery).

2.2. Collected data

Charts were reviewed for demographic data and medical history, treatment received before hospitalization, clinical presentation, biological and bacteriological data, radiological evaluation, treatment, duration of fever, duration of hospitalization and complications.

2.3. Treatment

Medical treatment was instigated initially in 44% of patients ($n = 44$), consisting in all cases of intravenous antibiotics (3rd generation cephalosporin + clindamycin) prescribed for 5 days, followed by 10 days of oral antibiotics (amoxicillin–clavulanate).

These antibiotics cover the organisms most frequently isolated in retropharyngeal infections [4]. Medical treatment failure was defined as the absence of clinical improvement after 48–72 h. In such cases, surgical drainage was performed.

First line surgical drainage associated with the same antibiotic protocol was instigated for all remaining patients (56%; $n = 57$). The surgical approach was intraoral for all but one patient (extension of the abscess to the mediastinum).

* Corresponding author. Tel.: +33 611101894; fax: +33 144494690.
E-mail address: vincent.couloigner@nck.aphp.fr (V. Couloigner).

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The choice between medical and surgical treatment was undertaken by the ENT practitioner in charge of the patient according to his own decisional criteria, without any specific written protocol.

2.4. Statistics

Chi-square test was used to analyze the categorical variables and analysis of variance for continuous variables. A p value ≤ 0.05 was considered statistically significant.

3. Results

3.1. Demographic data

Two-thirds of patients were males (67/34). Patient's ages ranged from 6 to 163 months (52 ± 34 months, mean $\pm$ S.D.). Seventy-seven percent of patients were under 6 years of age, and 91% were under 8. Children who underwent surgery as a first line treatment or after medical treatment failure were younger than medically treated patients (45.9 ± 29.5 months versus 62.4 ± 39.6 months; $p = 0.02$). No patient had any significant medical history.

3.2. Before admission

The delay between first symptom and hospitalization was 3.41 ± 2.1 days (mean $\pm$ S.D., median value: 3 days).

Forty-three percent ($n = 43$) of patients had already received oral antibiotics before admission (median duration: 2 days; 2.85 ± 1.78 days, mean $\pm$ S.D.). The most frequently prescribed oral antibiotics before hospitalization were amoxicillin–clavulanate ($n = 22$), followed by third generation cephalosporins ($n = 13$), amoxicillin ($n = 6$), josamycin ($n = 1$), clarithromycin ($n = 1$). Thirty-two percent ($n = 32$) of patients had received non-steroidal anti-inflammatory drugs (NSAIDs) prior to admission.

3.3. Clinical presentation

The following symptoms were observed: fever (100%), pain (100%), neck stiffness or torticollis (86%), neck swelling (68%), oropharyngeal bulging (67%), dysphagia (63%), trismus (11%), dyspnea (2%).

3.4. Radiological data

Cervical and thoracic CT scan with intravenous contrast was performed in 98% of cases ($n = 99$). In one case, an MRI was performed, and in another case, no imaging was prescribed due to major dyspnea requiring immediate surgery.

Rim enhancement (RE) was a very frequent finding: it occurred in 81% of all patients ($n = 82$) and 96.5% of patient undergoing first-line surgery ($n = 55$). Pus was found more frequently in cases of RE (69.1% versus 0% in the absence of RE; $p = 0.04$). Thus, this radiologic parameter had a negative predictive value of 100% and a positive predictive value of 69%.

A hypodense core was observed in all patients. Its density was associated with the presence of pus. A core density below 32 HU was found in 84.6% of patients in whom pus was found during surgery, versus only 40% of patients in whom no pus was found ($p = 0.02$) (Fig. 1). Choosing this cut-off value of 32 HU, the NPV and PPV of this parameter were 75% and 73%, respectively.

RE and core density were not independent variables: the core density value was lower (28 ± 7.6 UH, mean $\pm$ S.D.) in the presence than in the absence (60 ± 22 UH, mean $\pm$ S.D.) of RE ($p = 1.411E{-}09$).

3.5. Bacteriology

Intraoperative pus samples were obtained in 57 cases. Thirty-eight microorganisms were isolated out of 35 positive samples. Streptococcus was the most frequent bacteria (72%, including 41% of *S. pyogenes*). The other bacterias were *Staphylococcus aureus* (13%), *Candida albicans* (6%), *Haemophilus influenzae* (3%), *Fusobacterium* sp. (3%), and *Abiotrophia* sp. (3%).

S. aureus was more frequent in children under 1 year of age (60% versus 6.7%) ($p = 0.001$).

Out of the positive samples, 12 patients had received oral antibiotics before admission: the identified bacteria were sensitive to the antibiotic used in all but one case.

Blood cultures were positive in only 2 out of 12 samples: 1 *S. aureus* and 1 *Streptococcus pneumonia* were isolated.

3.6. Biology

Neutrophilic leukocytosis was almost always observed (22,474 GB/mm^3 $\pm$ 8603, mean $\pm$ S.D.), associated with an elevated C-reactive protein concentration (mean 139 mg/L $\pm$ 99, mean $\pm$ S.D., with highly variable values from 6 mg/L to 472 mg/L).

3.7. Complications

Only 4 major complications were observed, including 3 cases of upper airway obstruction, with one temporary tracheostomy, and 1 case of necrotizing fasciitis and mediastinitis with a long

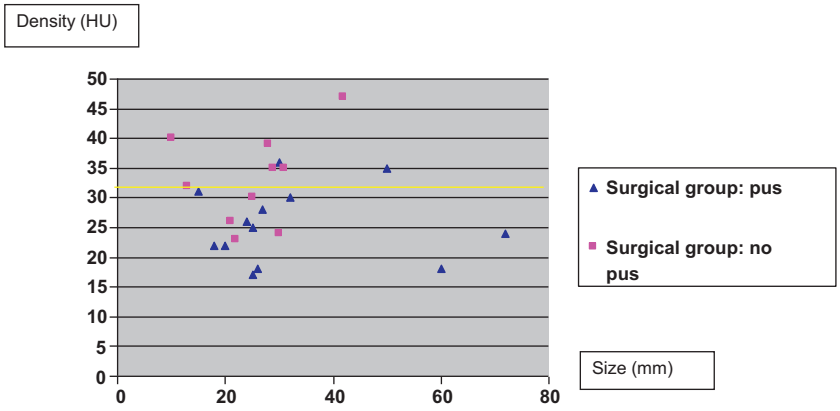

Fig. 1. Relationship between core densities, size of the abscess and surgical findings.