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## Retropharyngeal and retrosternal abscess in an 8-month-old child

### Ropień zagardłowy i zamostkowy u 8-miesięcznego dziecka

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#### KEYWORDS

retropharyngeal abscess, retrosternal abscess, mediastinitis, parapharyngeal space, pediatric otolaryngology, pediatric surgery

#### SŁOWA KLUCZOWE

ropień zagardłowy, ropień zamostkowy, zapalenie śródpiersia, przestrzeń przygardłowa, otolaryngologia dziecięca, chirurgia dziecięca

#### SUMMARY

Retropharyngeal abscess and retrosternal abscess are rare complications of infections in the head and neck. Statistically, they occur with a frequency of approximately 4.6 per 100,000 children. The main cause of these complications are infections of the oral cavity and pharynx. Caused by various bacteria – aerobic and anaerobic. *S. pyogenes* and *S. aureus* predominate among aerobic bacteria, and *Peptostreptococcus* among anaerobic bacteria. Using the example of a clinical case of an 8-month-old boy, the diagnostic and therapeutic problems of these two conditions will be presented. These are situations that may pose a threat to the patient's life, so they should be diagnosed quickly by performing laboratory blood tests and radiological diagnostics – contrast enhanced computed tomography. If a deep neck abscess or a retrosternal abscess is suspected, broad-spectrum antibiotic therapy should be initiated until the results of radiological tests are obtained and neoplastic germ cell lesions are excluded. When an oncological cause has been excluded, the patient should be qualified for urgent surgical treatment – puncture and drainage of the abscess, and after obtaining microbiological results, targeted antibiotic therapy should be started.

#### STRESZCZENIE

Ropień zagardłowy oraz ropień zamostkowy są rzadkimi powikłaniami zakażeń w obrębie głowy i szyi. Statystycznie występują one z częstotliwością ok. 4,6 na 100 000 dzieci. Główną przyczyną występowania tych powikłań są infekcje w obrębie jamy ustnej i gardła, wywoływane przez różne bakterie – tlenowe oraz beztlenowe. Wśród bakterii tlenowych dominują *S. pyogenes* oraz *S. aureus*, a wśród beztlenowych – *Peptostreptococcus*. Na przykładzie przypadku klinicznego 8-miesięcznego chłopca zostanie przybliżony problem diagnostyczny oraz terapeutyczny tych dwóch stanów. Są to sytuacje, których występowanie może wiązać się z zagrożeniem życia pacjenta, należy więc je szybko diagnozować poprzez wykonanie badań laboratoryjnych z krwi oraz diagnostyki radiologicznej – tomografii komputerowej z podaniem środka kontrastowego. Przy podejrzeniu ropnia głębokiego szyi oraz ropnia zamostkowego należy włączyć antybiotykoterapię szerokospektralną do czasu uzyskania wyniku badań radiologicznych oraz wykluczenia nowotworowych zmian germinalnych. Gdy podłoże onkologiczne zostanie wykluczone, pacjenta należy zakwalifikować do pilnego leczenia chirurgicznego – punkcji oraz drenażu ropnia, a po uzyskaniu wyników mikrobiologicznych rozpocząć antybiotykoterapie celowaną.

## INTRODUCTION

The aim of the study was to analyze the literature focused on deep neck and mediastinum abscesses, as well as to present a case of extensive retropharyngeal abscess and retrosternal abscess as a complication of acute upper respiratory tract inflammation in an 8-month-old child hospitalized at the Children's Clinical Hospital of the University Clinical Center of the Medical University of Warsaw.

## CASE REPORT

An 8-month-old boy was admitted to the district hospital due to high fever reaching 40 degrees Celsius, with no improvement after conservative treatment – he took azithromycin on an outpatient basis for 5 days. Upon admission, laboratory tests were performed, which showed increased inflammatory markers – CRP 189.3 mg/dl ( $N < 5$ ), WBC 43,000 with a neutrophilic smear. A chest X-ray and lung ultrasound were performed, which revealed fluid in the left pleural cavity. The treatment included intravenous antibiotic therapy – ceftriaxone, with partial improvement in the child's general condition. Due to persistent fever, clindamycin was added to the treatment after 7 days. In follow-up laboratory blood tests, a partial decrease in inflammation markers was observed, and at the same time, follow-up lung ultrasound revealed fluid retention in the left pleural cavity. Due to the limitations in diagnostic and therapeutic possibilities, it was decided to transfer the child to the Clinical Department of Pediatric Surgery, Pediatric Urology and Pediatrics of Children's Clinical Hospital of the University Clinical Center of the Medical University of Warsaw.

Upon admission to the clinic, the child was conscious, with normal contact appropriate to the age, without fever, oxygen saturation of 96-100%, with no signs of shortness of breath or dehydration. During physical examination, a significantly swollen throat was noted. It was decided to extend the diagnostics to include imaging tests to assess potential complications. A contrast enhanced computed tomography of the head, neck and chest was performed, which revealed fluid spaces with thickening of the soft tissues of the upper mediastinum (fig. 1), a fluid space extending along the paraspinal area up to the height of adenoid (fig. 2) and persistent fluid in the left pleural cavity was confirmed.

During the night shift, the boy remained in a stable condition, with periodic increases in swelling of the head and neck, especially when crying, and without drops in oxygen saturation.

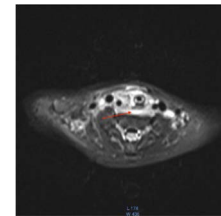
Due to the significant severity of inflammatory changes, a multidisciplinary consultation (otorhinolaryngology, oncology and radiology) was convened. Indications for urgent magnetic resonance imaging were established for more accurate local assessment and differentiation of the described lesions in the upper mediastinum – inflammatory and neoplastic lesions. In-depth diagnostics for germ cell tumors ( $\alpha$ -fetoprotein,  $\beta$ -HCG) and determination of the ASO level were planned. Antibiotic therapy was modified to include penicillin and vancomycin.



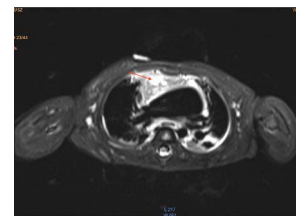
**Fig. 1** CT scan of the chest and neck. The arrow shows the fluid space surrounded by thickened soft tissues of the upper mediastinum.



**Fig 2.** CT scan of the chest and neck. The arrows mark fluid spaces in the upper mediastinum and along the paravertebral region (retropharyngeal abscess).



**Fig 3.** MRI in the T2 sequence, arrow marks the parapharyngeal space with a probable fluid space visible.



**Fig 4.** MRI in the T2 sequence of the chest, arrow marks the probable fluid space in mediastinum.

The tests for germ cell tumors were negative and the ASO concentration was low. Magnetic resonance imaging revealed significant thickening of the soft tissues of the prespinal retropharyngeal space (fig. 3), including the upper mediastinum and the prevascular compartment of the mediastinum (fig. 4), with features of diffusion restriction and enhancement after administration of a contrast agent, suggesting a massive inflammatory infiltrate.

During hospitalization, the child's condition deteriorated – there was increasing asymmetry in the face and neck, and significant anxiety, especially in the lying position.

Therefore, it was decided to qualify for urgent surgical treatment – puncture and drainage of abscesses.

Under general anesthesia, a puncture was performed, followed by a revision of the retropharyngeal space (otorhinolaryngological team) – no discharge of purulent content was achieved. Subsequently, mediastinal drainage was performed (surgical team) – severe inflammatory changes were

found, the presence of a retrosternal abscess was excluded, only serous content was leaked. After the procedure, the child's condition was stable, remained circulatory and respiratory functional, did not require prolonged intubation. During treatment, gradual improvement of the general condition and local conditions was observed, including normalization of inflammatory parameters. Antibiotic therapy was continued for 2 weeks, then the patient was declared cured and discharged home.

Blood cultures taken several times were negative. Due to the lack of obvious pus collections during the surgical procedures, it was not possible to collect material for microbiological evaluation.

## DISCUSSION

Deep neck abscesses are serious, rare complications of acute inflammation of the upper respiratory tract (nasopharynx, tonsils, pharynx). The incidence of this condition is 4.6 per 100,000 children (1). Children under 5 years of age are most at risk, especially patients suffering from a bacterial infection with concomitant inflammation of the lymph nodes in the neck. The reduced risk of disease in children over 5 years of age is due to the gradual involution of the parapharyngeal lymph nodes (fig. 5). The most common area where abscesses may form (apart from peritonsillar abscesses) is the retropharyngeal space (fig. 6) (2).

The most common symptoms of retropharyngeal abscess are fever (95%), swelling of the back wall of the throat, impaired neck mobility, trismus, asymmetry of the face and/

or neck (81%) (3). Swelling may cause swallowing problems and shortness of breath. It is a progressive disease that may cause a sudden deterioration of health and may pose a threat to the patient's life (4).

Mediastinitis is a rare type of infection that is associated with high morbidity and mortality due to involvement of the tissues surrounding the mediastinal organs. These are complications most often after sternotomy (occurrence from 1.1 to 19%) (5), endoscopic procedures, infections in the oral cavity and throat or odontogenic diseases (6). These infections spread descending through the spaces in the neck. The main symptoms of mediastinitis are sternal pain when breathing and high fever (7). Mediastinitis is a fatal infection in the absence of proper treatment, therefore mediastinitis should be considered a life-threatening condition and requires immediate multidisciplinary medical care (8). We distinguish retrosternal abscess as one of the forms of acute mediastinitis.

In symptomatic patients, contrast enhanced computed tomography is very sensitive (92%) in diagnosing an abscess and allows determining the extent of the abscess and the involvement of adjacent structures such as the mediastinum (9).

Deep neck abscesses have a polymicrobial etiology, they are caused by both aerobic and anaerobic bacteria, therefore they require broad-spectrum treatment with antibiotics. The most common microorganisms that are associated with deep tissue infections of the neck include *S. aureus*, *S. viridans*, *K. pneumonia*, *Bacteroides*, and *Peptostreptococcus* (10). Other studies show the dominance of aerobic bacteria by *S. pyogenes* – 41% and *S. aureus* – 32%. In third place is *H. influenzae* – 4%, such a small number may be the reason for the use of preventive vaccinations in children. Anaerobic bacteria *Peptostreptococcus* sp. – 28%, the above-mentioned microorganisms cause the most complications in the form of deep neck abscesses (11).

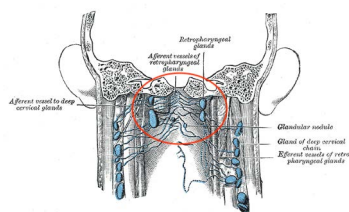


Fig 5. Retropharyngeal space, with visible retropharyngeal lymph nodes (nodes of Henle) (in ellipse) [https://en.wikipedia.org/wiki/Retropharyngeal\_lymph\_nodes#/media/File:Gray603.png]

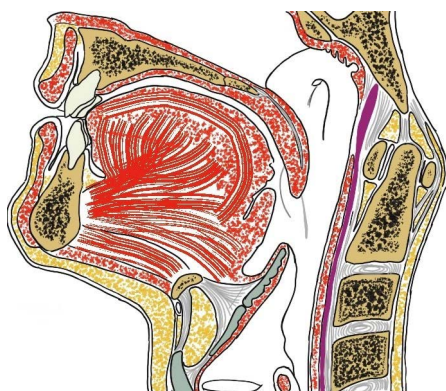


Fig 6. Representation of the anatomical location of the retropharyngeal space

## CONCLUSIONS

Retropharyngeal and retrosternal abscesses are extremely rare complications of upper respiratory tract inflammation in such young children. They should always be treated as a life-threatening condition that requires urgent intervention of a multidisciplinary team, which allows to reduce mortality among patients (12).

To diagnose deep neck abscesses the contrast enhanced computed tomography should be performed. Ultrasound examinations can be used to assess the treatment process in children (13, 14).

The basis of treatment is drainage of abscesses and intravenous broad-spectrum antibiotic therapy.

**CONFLICT OF INTEREST**  
**KONFLIKT INTERESÓW**

None  
Brak konfliktu interesów

**CORRESPONDENCE**  
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