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Case report

PEDIATRIC EMERGENCY OF UNEXPECTED CAUSE: INFANTILE FIBROMATOSIS - CASE REPORT

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Abstract: Introduction: Infantile fibromatosis (IF) is a rare benign mesenchymal tumor of early childhood, located solitarily or multicentrically in the skin, soft tissues, muscles, bones, or visceral organs. The cause is unknown, and some cases are linked to mutations in two different genes. Rapid growth is typical, and while there are reports of spontaneous regression, relapses have also been recorded. Treatment depends on the location of the lesions, with surgery being the main treatment option.

Case report: This paper presents an unusual emergency presentation of infantile fibromatosis in a 16-month-old girl, initially manifested as acute laryngitis. The rapid development of respiratory failure necessitated immediate life-saving treatment. Emergency diagnostics revealed a large mass deep within the neck structures, causing significant compression and endangering the airways. The child's condition was critical, and the multidisciplinary team thoroughly discussed available treatment options. Eventually, after careful preparations, the tumormass was surgically removed on the sixth day. The postoperative course was challenging, but the outcome was positive. Pathohistological diagnosis confirmed infantile fibromatosis, and the treatment was successfully completed.

Conclusion: Despite its rarity, infantile fibromatosis must be considered a potential cause of urgent, life-threatening conditions in children. Treatment requires individual adaptation and collaboration with a multidisciplinary team.

Keywords: infantile fibromatosis, rare diseases, compromised airway, pediatric intensive care.

INTRODUCTION

Infantile fibromatosis (IF) is a rare benign mesenchymal tumor that primarily affects early childhood and can occur solitarily or in multiple locations in the skin, soft tissues, muscles, bones, or visceral organs (1). Initially termed "congenital generalized fibromatosis" by Stout in 1954, it was later referred to as "infantile myofibromatosis" due to the histological similarity of tumor cells to myofibroblasts and its frequent occurrence in newborns and infants (2).

Though IF tumors do not metastasize, their growth can lead to compression and damage to surrounding organs and tissues (3). Being classified as rare diseases, IF manifests with diverse localizations and presentations, sharing a common pathohistological appearance (4).

The exact cause of IF remains unknown, and most cases occur randomly without a discernible reason. However, some rare cases have been associated with mutations in two different genes, PDGFRB and NOTCH3, currently under extensive research (5-8).

Treatment of IF depends on lesion location. While rapid growth is typical, spontaneous regression has been reported, as well as instances of relapse (4). Surgical intervention remains the primary treatment option (9-12). Interestingly, up to 30% of cases involve threatening localization in the head and neck structures (1-4).

This paper presents an exceptional case of infantile fibromatosis in a 16-month-old girl, initially presenting with acute laryngitis, which rapidly progressed to respiratory insufficiency, requiring immediate life-saving treatment.

CASE REPORT

A 16-month-old girl was admitted to the pediatric clinic following an examination by an otolaryngologist for the treatment of acute laryngitis. On admission, she presented as pale, afebrile, and slightly inspiratory dyspnoic, with a hoarse cough and moderate severity of the disease. Her condition seemed similar to other children of the same age being treated for similar problems during the season. Initial biochemical

parameters, including C-reactive protein, complete blood count, urea, creatinine, and electrolytes, showed no significant deviations, except for respiratory acidosis observed in the gas analysis.

Unexpectedly, the patient did not respond to the standard treatment protocol and rapidly deteriorated, developing progressive respiratory insufficiency. Urgent transfer to the intensive care unit (ICU) was necessary for immediate intubation and mechanical ventilation. Due to the complexity of her airway, intubation posed challenges, requiring complete analgosedation, relaxation, and other general supportive therapies and further diagnostics.

Following stabilization, the presence of neck swelling and asymmetry was noted, along with a palpable mass on the right side of the neck, prompting further urgent investigation. Given the critical condition, the multidisciplinary team explored treatment options. Chest X-rays indicated pulmonary infiltration, atelectasis, and an enlarged upper mediastinum. X-ray of the hypopharynx revealed narrowing of the upper esophagus, likely due to external compression. Brain CT results were normal. Subsequent CT and MRI scans of the neck and thorax confirmed a large mass (Figure 1 and 2), which compressed vascular structures and involved the mediastinum. Angiography (Figure 3) suggested a differential diagnosis of hemangioma, leading to the initiation of propranolol therapy along with other treatments.

In the pediatric intensive care unit (PICU), the patient's condition remained critical, with hyperdynamic, febrile, and edematous features, and clinical signs of superior vena cava syndrome and multiorgan

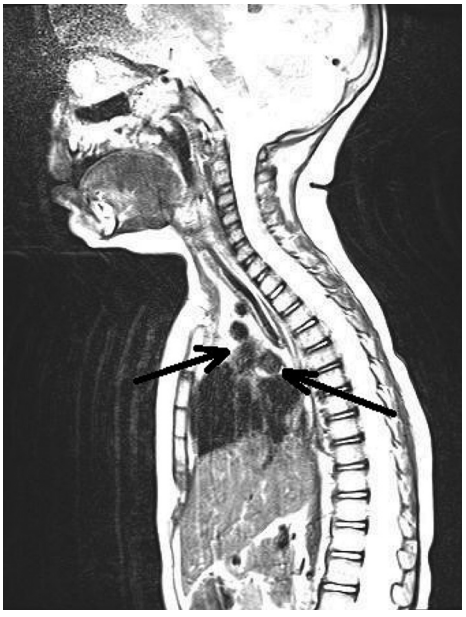

Figure 1. *Presentation of the tumor mass with CT scan*

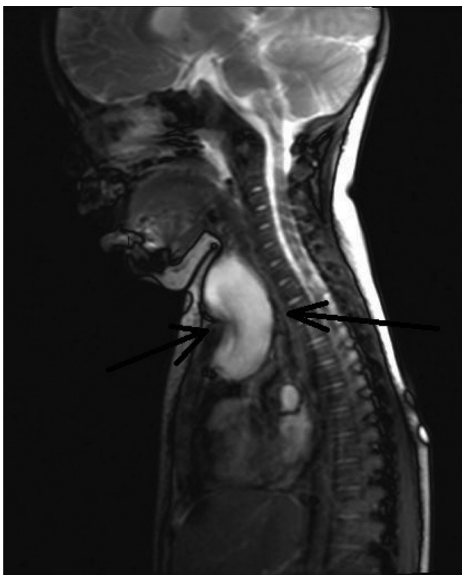

Figure 2. *Magnetic resonance imaging (MRI) of the tumor mass*

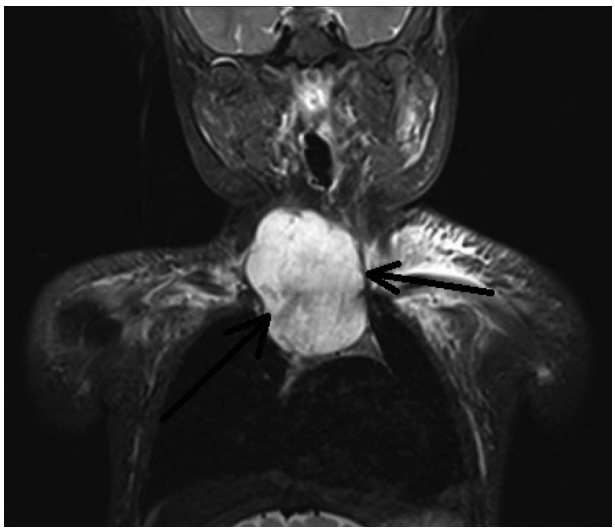

Figure 3. *Imaging of the tumor mass with magnetic resonance angiography (MRA)*

dysfunction. The lungs were particularly challenging, necessitating substantial support to maintain stability. A daily multidisciplinary team reviewed treatment options, including pediatricians, otolaryngologists, pediatric surgeons, hemato-oncologists, anesthesiologists, infectious disease specialists, clinical pharmacologists, cardiologists, endocrinologists, pediatric neurologists, and others. Preoperative preparation was comprehensive, involving detailed biochemical tests and multiorgan assessments.

Most findings from hematological parameters, coagulation status, thyroid hormones, and flow cytometry were normal. A decrease in immunoglobulin G (2.93g/L) led to treatment with intravenous gammaglobulins. Extensive microbiological examinations were generally negative, with only respiratory profile

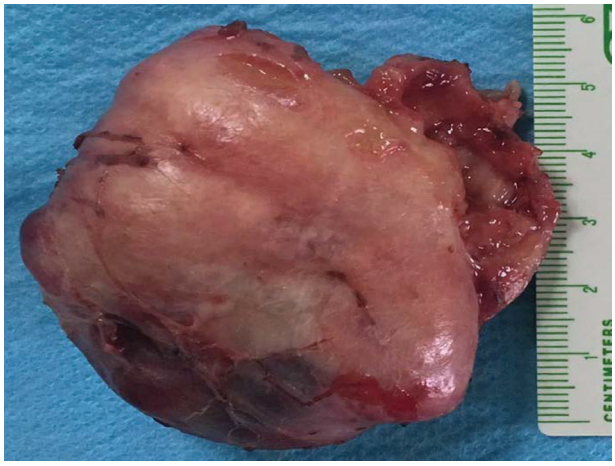

Figure 4. *The tumor mass was successfully removed completely, the size corresponded to the imaging studies*

tests indicating positive Coxyckie virus type A7 and indeterminate Quantiferon TB results, leading to additional gastric lavage testing. Repeated blood, urine, and swab cultures were performed.

Surgery with a high ASA risk was performed collaboratively with an ENT and pediatric surgeon on the 6th day of hospitalization. The tumor mass was completely removed, resembling one of the fibrous tumors of childhood, and sent for Ph.D. verification. The size corresponded to the imaging studies (Figure 4).

In the early postoperative course, the patient remained demanding, with persistent fever and bilateral pulmonary infiltration and atelectasis. On the 5th postoperative day (12th PICU day), after two unsuccessful attempts, she was finally extubated. Following extubation, she showed gradual recovery but with hypotonia and mild neurological deficit (discrete hemiparesis). Physical treatment, under the consultation of a neurologist and physiatrist, was initiated. On the 13th postoperative day (19th PICU day), she became febrile again, with stable cardiorespiratory parameters, but with elevated infection markers, leukopenia, neutropenia, slightly elevated toxic hepatitis parameters, and confirmed Candida sepsis, which was successfully treated.

The final PHD diagnosis was infantile fibromatosis, confirmed by additional molecular genetic testing. Further treatment continued at the Hemato-oncology department. Re-evaluation of the patient's clinical condition, laboratory results, and radiological findings confirmed excellent recovery. She was discharged from the hospital after a total of 6 weeks (25 PICU days) and has been under follow-up care by a pediatrician, hemato-oncologist, physiatrist, and neurologist. So far, her development has been satisfactory, and there have been no signs of disease relapse.

DISCUSSION

Infantile fibromatosis (IF) is in the register of rare diseases and is a benign mesenchymal tumor of early childhood, with varied manifestations (1). Symptoms vary in severity, depending on localization, with possible spontaneous regression (11), but also very complicated presentations if it involves internal organs, as was our case. It is important to note that each case is unique, which can be concluded from the literature, published mainly in the form of case series (2, 3).

Although IF does not metastasize, it grows rapidly, and depending on its localization, can damage nearby structures (1). Single tumors are the most common in up to 80% of cases (2), half of which are described on the head and neck (3), and 60% are reported in children under 2 years of age (4). This all applies to our case as well. The solitary form occurs predominantly in males (1), while in our case it was the opposite. Single bone tumors have been described, but they are extremely rare (11). Multifocal forms are more common in females (2, 3). This form with visceral involvement is considered the most severe form, which can cause severe, life-threatening complications, depending on the exact location (9). Our example, although it was solitary, caused an acute, life-threatening condition by its location

The etiology of IF is unknown and in most published cases there was no previous family history. Mutations in two genes are reported as the cause in some cases: the neurogenic locus protein homolog 3 gene (NOTCH3) (8) and the platelet-derived growth factor receptor beta (PDGFRB) gene (5-7). In our case, there were no previous examples of IF in the family, and additional molecular genetic testing did not confirm the marked genes.

Other soft tissue tumors may resemble IF (1). In our case as well, the postoperative macroscopic appearance of the tumor gave the possibility of guessing. Definitive confirmation of IF is based solely on the pathohistological diagnosis. Imaging studies, including ultrasound, CT, and MRI, are most commonly used to visualize tumor location, size, and extent, to decide on therapeutic options and surgical procedures, and to diagnose tumor recurrence during follow-up,as already evidenced by peer reports (2-4, 13).

Treatment is mostly surgical, but in any case, it should be personalized and may require the coordinated efforts of a team of experts. Genetic counseling is recommended as well as psychosocial support for the family. Due to the rarity of the disease, there are no studies on a large group of patients. Experiences with different treatments have been reported in the medical literature individually or in small series of patients (9-12). There are no standardized treatment protocols or guidelines.

Decisions should be made by a multidisciplinary team with careful consultation with the patient and family.

Surgical removal is the first option in the case of involvement of internal organs or in the case of lesions that are life-threatening due to their location, as in our case. In approximately 10% of cases, lesions may recur after surgery. The postoperative course was complicated by confirmed Candida sepsis, which was expected, given all the existing risk factors for systemic fungal infection (14). Chemotherapy may be used to treat cases (9) where the surgery was unsuccessful, if lesions recur, or if lesions are unresectable due to the location. In similar cases, interferon alfa (12) or cytostatic combination have also been used successfully.

CONCLUSION

Although infantile fibromatosis is very rare, it must be considered a possible cause of urgent, life-threatening conditions in children. Treatment must be individually adapted and with a multidisciplinary team.

Abbreviations

IF — Infantile Fibromatosis (IF)
MV — Mechanical Ventilation
CT — Computerized Tomography
MRI — Magnetic Resonance Imaging
MRA — Magnetic Resonance Angiography
PICU — Pediatric Intensive Care Unit
ASA — American Society of Anesthesiologists
ENT — Ear, Nose, and Throat Doctors (Otolaryngologists)
Ph.D. — Pathohistological Diagnosis
PDGFRB — Platelet-Derived Growth Factor Receptor Beta Gene
NOTCH3 — Neurogenic Locus Notch Homolog Protein 3 Gene

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Sažetak

HITNO STANJE U PEDIJATRIJI NEOČEKIVANOG UZROKA: INFANTILNA FIBROMATOZA - PRIKAZ SLUČAJA

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Uvod: Infantilna fibromatoza (IF) je redak benigni mezenhimalni tumor ranog detinjstva, solitaran ili multicentričan u koži, mekim tkivima, mišićima, kostima ili visceralnim organima. Uzrok je nepoznat, a neki slučajevi su povezani s mutacijama u dva različita gena. Brz rast je tipičan, postoje izveštaji o spontanoj regresiji, ali su zabeleženi i recidivi. Lečenje zavisi od lokacije lezija, a operacija je glavna opcija lečenja.

Prikaz slučaja: U radu je prikazana neobična urgentna prezentacija infantilne fibromatoze kod 16-mesečne devojčice, u početku predstavljena kao akutni laringitis. Veoma brz razvoj respiratorne insuficijencije zahtevao je hitno lečenje koje spašava život. Hitna dijagnostika otkrila je veliku tumorsku masu duboko u strukturama vrata, koja je izrazito, kompresijom, ugrožavala disajne puteve. Stanje deteta je bilo vrlo kritično, a nije bilo drugih bezbednih opcija lečenja, o čemu je odlučivao multidisciplinarni tim. Nakon pažljivih priprema, tumorska masa je hirurški uklonjena šestog dana. Usledio je težak postoperativni tok, ali sa pozitivnim konačnim ishodom. Infantilna fibromatoza je patohistološki potvrđena i lečenje je uspešno završeno.

Zaključak: Iako je infantilna fibromatoza vrlo retka, mora se razmatrati kao mogući uzrok hitnih, životno opasnih stanja kod dece. Tretman mora biti individualno prilagođen i sa multidisciplinarnim pristupom.

Ključne reči: infantilna fibromatoza, retke bolesti, kompromitovani disajni put, pedijatrijska intenzivna nega.

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