

## CASE REPORT

# Orthopaedic patterns of retroperitoneal tumors in pediatric population

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**Abstract:** The paper presents three children of various ages with tumors of different histology localized in the retroperitoneum. The children underwent investigation as orthopedic cases at the Orthopedic Department of the Belgrade University Childrens' Hospital. All children had orthopedic symptoms and several similar clinical findings: high or increased red blood cell (RBC) sedimentation, increased lactate dehydrogenase (LDH) and hypochromic anemia. Retroperitoneal tumors were diagnosed by echosonography. Further investigations were targeted towards histological verification and treatment protocol for retroperitoneal tumor. Since the children were presented chronologically to the department, diagnosis was reached more rapidly. It is our aim to draw attention to the possibility that various retroperitoneal tumors can be presented as orthopedic diseases. If symptomatology of retroperitoneal tumors is suspected and particularly in insufficiently clear cases, one should always perform echosonography of the retroperitoneum as a non-aggressive, simple, readily available and reliable diagnostic method. This reduces examination time, direction of patients to further treatment according to pathology and also in reduction of risk both for patient and orthopedic surgeon who normally are presented with such diseases (*Fig. 2, Ref. 10*). Full Text (Free, PDF) [www.bmj.sk](http://www.bmj.sk).  
Key words: retroperitoneal tumors, children, diagnostics.

Retroperitoneal tumors in children show diversity of histological findings, clinical features, radiographic and other presentations. The mode of treatment and outcome depend on the nature of tumor, histological findings and timely diagnosis (1, 2, 3, 4). Due to symptoms that are usually non-specific, retroperitoneal tumors are diagnosed as large tumors with infiltration of adjacent organs (1, 5). Though diagnostic modalities significantly improved, diagnosis is often made late (5). These tumors can have unusual onset and children may be reported to an orthopaedist due to orthopedic problem. Fortunately, the problem does not occur frequently and it does not enter the domain of treatment of the orthopaedic surgeon. The possibility of failure in making a timely diagnosis and referring the child for further investigation and treatment in a corresponding institution could result in a very unpleasant situation for the orthopaedic surgeon and particularly for the patient. In the literature there are very few data on such tumors within orthopaedic problems (6, 7).

Therefore, we present 3 cases of retroperitoneal tumors in children that were evaluated at our department with primarily orthopaedic symptoms.

## Material and methods

### Case 1

A boy aged 3 years, admitted to the University Childrens Hospital (UCH) in Belgrade in 2000, due to pain of the right hip, limping and fever up to 40 °C. The disease onset started with pain of the right thigh a month prior to presentation at this hospital. The child was treated with ibuprofen for 15 days. As the problem persisted, 15 days later the patient was hospitalized at a local hospital with the diagnosis of acute hematogenous arthritis of the right hip. Therapy with antibiotics was initiated and percutaneous tractions were applied.

As there was no improvement, 15 days later the was referred to UCH. On admission there was painful sensitivity of the right hip, limited abduction and absence of fluctuation. In laboratory findings there was increased sedimentation of erythrocytes observed (SE) 110, fibrinogen 12.32, LDH 952, C-reactive protein (CRP) >96, white blood cells (WBC) count 7.2 and hypochromic anemia. Hip radiography (AP and Lowenstein) was within normal limits. Hip joint puncture: sterile culture to anaerobes and aerobes. Direct bacteria were not isolated. Cytological findings: a large number of red blood cells (RBC).

Abdominal echosonography: bundles of enlarged lymph nodes in the celiac trunk, hilus of the liver and the spleen. Enlarged liver of homogenous structure. A cauliflower like tumor mass, posterior and medial to the left kidney. Computerized tomography (CT) findings detected bindles of enlarged lympho-

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Fig. 1. Retroperitoneal mass in abdomen before injection of contrast medium.



Fig. 2. Retroperitoneal mass in abdomen after injection of contrast medium.

glandulae bilaterally, supra and infraclavicularly, which descend in conglomerates along the posterior mediastinum, prevertebrally and paravertebrally up to the retroperitoneum (Figs 1 and 2). The largest tumor mass is in the upper part of the retroperitoneum containing a solid multilobulated tumor. The mass encompasses the aorta, lower vena cava, celiac trunk and the superior mesenteric artery. The pancreas and the spleen are pushed backwards.

Diagnosis: retroperitoneal tumor. Pathohistological findings: poorly differentiated neuroblastoma. The child was transferred to the Oncology Department. The outcome was lethal.

#### Case 2

A girl aged 2 years, admitted to the UCH in Belgrade in 2001 due to pain of the right leg, mainly in the region of the knee. Pain that was developed 10 days prior to admission was waking the child during nights. Two years before admission the child underwent treatment for osteomyelitis of the distal part of the right thigh, after which it had intensive pain on 5–6 occasions subsiding on administration of ibuprofen. On admission the child was limping. Her right knee was swollen and sensitive to palpation. X-ray of the knee was with no pathological changes. Relevant laboratory findings: SE 35, fibrinogen 5.2, signs of hypochromic anemia. Alkalic phosphatase was not detected due to technical reasons while LDH was 757 (normal up to 450). Other findings were within normal limits. Skeletal scintigraphy: zones of asymmetrical contrast collections in bones were not clearly detected.

The pathological condition was connected to earlier osteomyelitis and treatment with antibiotics was initiated. After several days we disclosed a marked venous pattern of the anterior abdominal wall and a tumefaction palpated in the right inguinal region.

Abdominal echosonography showed large multilobulated mass pressing the bladder with a solid thrombus in the inferior vena cava of the pelvis close to the hilus of the liver.

Diagnosis was retroperitoneal tumor. CT detected in the basal part of the lungs soft tissue pathological changes 10 mm in diameter, probably metastases. Single-standing lymphoglandulae 15 mm in diameter, paracavally and along the abdominal aorta. The lumen of the inferior vena cava contains soft tissue masses (thrombi). A multilobular mass compromising the posterior bladder wall. Biopsy findings showed no tumor cell differentiation with unspecific immunohistochemical profile. A desmoplastic tumor containing small round cells, Ewing sarcoma. The child was transferred to the Oncology department and underwent complete chemotherapy. The outcome was lethal.

#### Case 3

An 8 years old boy admitted to the University children Hospital in Belgrade in 2001 due to pain of lower extremities. The problems, occurring mostly after physical activities, started 10 years prior to admission. Over the last 5 years pain occurred during nights.

Since then child has been unable to sit or be in lying position and could only walk with bent legs which eased his pain. The patient was treated with ibuprofen and alcohol compresses. On admission the child could walk normally but was unable to be in supine position due to pain of the left thigh. Motions of hips, knees and feet were normal.

Kernig's sign was negative. On palpation the abdomen in the chest level was soft without tumefactions or localized pain. X-ray of the pelvis and left thigh bone was without pathological changes. Laboratory findings: SE 15; fibrinogen 1.9; Ca, P and alkalic phosphates were within normal limits. SGPT 38, SGOT 169, LDH 493 and CRP <6. Hypochromic anemia. Other findings were irrelevant. Based on earlier experience abdominal echosonography was immediately done with the following findings: a tumor mass, multinodular, involving the liver and the spine. After consultation with a neurosurgeon CT was done, but

as it was impossible to determine whether the mass was intradural or extradural NMR was performed. Pathohistological findings showed hepatocellular cancer, not well differentiated. Hematooncological therapy was initiated. The outcome was lethal.

## Discussion

We have presented 3 patients that were admitted to the Orthopaedic Department of the UCH in Belgrade due to problems suggesting orthopaedic disease. They differed in age, clinical features and the course of disease. In the first case symptomatology suggested a possible inflammatory syndrome. Further investigation increasingly pointed at some other disease. Echosonography directed us to the proper diagnosis, which was retroperitoneal tumor.

In the second case previous bone infection (osteomyelitis) with daytime and night pain of the same leg could have suggested recurrent infection. Laboratory findings were unspecific but could be a sign of bone infection. However, scintigraphy indicated another possible localization of lesions, while echosonography of the retroperitoneum enabled us to make exact diagnosis which required further investigation and different treatment.

The third child had unspecific features and unspecific laboratory findings. When admitted to our hospital, based on previous experience, echosonography of the retroperitoneum was immediately done and the appropriate diagnosis was in fact made only a few hours after admission. The child was treated at the Hematooncology Department where the diagnosis of retroperitoneal tumor was confirmed.

For the first child much time was lost in search of the exact diagnosis and when the patient was admitted to a local hospital he underwent a 15 days of incorrect treatment for osteomyelitis. Only after 35 days from the disease onset or 5 days after admission at our hospital the exact diagnosis was made. For the second child diagnosis was made after 13 days (out of which he remained at home for 10 days without medical consultation). For the third child, based on the previous experience, the diagnosis was made after few hours.

In all children the common findings were: leg pain, increased or high RBC sedimentation rate, increased LDH and hypochromic anemia. Diagnosis of retroperitoneal tumor was made based on retroperitoneal and abdominal echosonography. A low-cost,

nonaggressive, harmless and readily available method of echosonography practically solved the dilemma and enabled further appropriate investigation and treatment (8, 9, 10).

When a child is admitted to an orthopaedic department due to pain in legs or other orthopaedic problems and particularly if clinical features are unspecific in the different diagnosis a retroperitoneal tumor should be taken into consideration. Beside other diagnostic procedures, routine diagnostic investigation should with no doubt also include echosonography of the abdomen and particularly of the retroperitoneum. The method is simple, readily available, not aggressive, does not harm the patient and it offers reliable data on possible tumors of the retroperitoneal region that had onset with orthopaedic symptomatology. Such an approach enables us to save time, avoid possible mistakes, make rapid diagnosis and apply appropriate treatment of the patient.

## Reference

1. **Gockel I, Oberholzer K, Gonner U et al.** Retroperitoneal sarcomas: diagnostic and therapy. *Zbl Chir* 2006; 131 (3): 223–229.
2. **Angervall L, Kindblom LG.** Principles for pathologic-anatomic diagnosis and classification of soft-tissue sarcoma. *Clin Orthop* 1993; 289: 9–18.
3. **Storm FK, Mahvi DM.** Diagnosis and management of retroperitoneal soft-tissue sarcoma. *Ann Surg* 1991; 214: 2–10.
4. **VanDam PA, Lowe DG, McKenzie-Gray B et al.** Retroperitoneal soft tissue sarcomas: A review of the literature. *Obstet Gynecol Surv* 1990; 45: 670–682.
5. **Erzen D, Sencar M, Novak J.** Retroperitoneal Sarcoma: 25 years of Experience With Aggressive Surgical Treatment at the Institute of Oncology, Ljubljana. *J Surg Oncol* 2005; 91: 1–9.
6. **Pinson CW, Remine SG, Fletcher WS et al.** Long-term results with primary retroperitoneal tumors. *Arch Surg* 1989; 124: 1168–1173.
7. **Sondak VK, Economou JS, Eilber FR.** Soft tissue sarcoma of the extremity and retroperitoneum: Advances in management. *Adv Surg* 1992; 24: 333–359.
8. **Alvarenga JC, Ball ABS, Fisher C et al.** Limitations of surgery in the treatment of retroperitoneal sarcoma. *Brit J Surg* 1991; 78: 912–916.
9. **Arlen M, Marcove RC.** Retroperitoneal Sarcomas. In: Arlen M, Marcove RC (Eds). *Surgical Management of Soft Tissue Sarcomas*. Philadelphia: WB Saunders; 1987: 220.
10. **Dalton RR, Donohue JH, Mucha P et al.** Management of retroperitoneal sarcoma. *Surgery* 1989; 106: 725–733.

Received September 5, 2008.  
Accepted December 18, 2008.