

Specificity of Tumor-like Bone Lesion Location in Children

Marina Gudushauri, Ramaz Chikhladze

Department of Traumatology and Orthopedics, Tbilisi State Medical University

Abstract

Analyses of the operative materials obtained from the children with diagnosed tumor-like bone lesions in 1981-2000, revealed that during the study period 172 cases of bone cyst, fibrous dysplasia, non osteogenic fibroma (metaphysis fibrous defect) and eosinophilic granuloma were registered. Most often tumor-like bone lesion developed in shinbones, arm and thighbones. Besides, mentioned above lesions were characterized by selective location in all the bones. This fact must be taken into account when the lesion is being diagnosed.

Key words: *tumor-like bone lesions, location, childhood age*

Introduction

The group of tumor-like bone lesions includes several pathologies (F. Schajowicz, 1994; Y.N. Solovyov, 1998); their pathologic foci develop in various bones with different frequency, besides they are characterized by specific foci location in bones (P.A. Ravell, 1993; V.V. Nekachalov, 2000). Literary data indicate that mentioned above regularity is specific for different age and ethnic groups (M.V. Volkov, 1985; N.N. Trapeznikov et al., 1986; J.V. Lantsman, 1990). As there were no such data for Georgia, we found it reasonable to study the specificity of tumor-like bone lesions location in children. The data achieved may play important role in developing reliable diagnostic and therapeutic methods.

Material and Methods

To study prevalence rate of tumor-like bone lesions in children, data for 1981-2000 were analyzed. During the study period 172 surgical interventions were performed in children; based on the results of pathohistologic

examination of operative materials, different tumor-like bone lesions were diagnosed. Analyzing the data obtained, attention was paid to pathologic foci location in different bones. Numeric data were analyzed using methods of biologic statistics; statistical determinants, student's (t) criteria, and conformity (X²) criteria were determined under the conditions of alternative variations. The 95%-evidence interval (P<0.05) was adopted as statistically evident.

Results

Pathohistologic examination of operative materials obtained from children, who underwent surgical interventions due to tumor-like bone lesions in 1981-2000, revealed following pathologies-bone cyst, fibrous dysplasia, non-osteogenic fibroma (metaphysis fibrous defect), and eosinophilic granuloma (solitary).

Data obtained indicate that tumor-like bone lesions developed most often in long tubular bones (94.19±1.78%). In skeletal bones mentioned pathologies were observed with different frequency and their location was characterized by some specificity (*Tab. 1*).

| No | Bones | Location/ Segment | Left Extremities | Right Extremities | Total | % |
|----|----------|----------------------|---------------------|----------------------|------------|----------------|
| 1 | Shin | Upper | 4 | 10 | 14 | (22.67(3.19)%) |
| | | Median | 1 | 2 | 3 | |
| | | Lower | 12 | 10 | 22 | |
| 2 | Thigh | Upper | 17 | 19 | 36 | (29.07(3.46)%) |
| | | Median | 3 | 2 | 5 | |
| | | Lower | 9 | 0 | 9 | |
| 3 | Arm | Upper | 22 | 21 | 43 | (33.14(3.59)%) |
| | | Median | 7 | 9 | 16 | |
| | | Lower | 0 | 0 | 0 | |
| 4 | Peroneal | Upper | 3 | 2 | 5 | (5.23(1.70)%) |
| | | Median | 0 | 0 | 0 | |
| | | Lower | 4 | 0 | 4 | |
| 5 | Elbow | Upper | 1 | 1 | 2 | (2.33(1.15)%) |
| | | Median | 1 | 0 | 1 | |
| | | Lower | 0 | 1 | 1 | |
| 6 | Spoke | Upper | 0 | 2 | 2 | (1.74(0.99)%) |
| | | Median | 0 | 1 | 1 | |
| | | Lower | 0 | 0 | 0 | |
| 7 | Collar | | 1 | 0 | 1 | (0.58±0.33)% |
| 8 | Foot | | 3 | 2 | 5 | (2.91±1.28)% |
| 9 | Hand | | 1 | 0 | 1 | (0.58±0.33)% |
| 10 | Shield | | 1 | 0 | 1 | (0.58±0.33)% |
| 11 | Pubic | | 1 | 0 | 1 | (0.58±0.33)% |
| 12 | Hip | | 1 | 0 | 1 | (0.58±0.33)% |
| | | | 92 | 82 | 174 | |

Tab.1 Location of tumor-like bone lesions in children.

Bone cyst was the most frequently diagnosed tumor like bone lesion (114 cases). Solitary, aneurismal and juxta-articular bone cysts were included in this group. Solitary cysts were the most frequent lesions, while aneurismal and juxta-articular cysts were diagnosed only in 5 patients. So-called solitary cyst form was registered in 42 cases; we think that it was related to organizational processes taking place in a bone cyst.

Fibrous dysplasia was another frequent pathology (38 cases), that occupied the second place among the tumor-like bone lesions in children. Fibrous dysplasia was located in the bones of extremities ($94.74 \pm 3.62\%$) and tubular bones ($89.47 \pm 4.98\%$).

Examination of operative and biopsy materials revealed that 18 patients had non-osteogenic fibroma that occupied the third place among the tumor-like bone lesions, and was located, mostly, in tubular bones of the extremities.

Pathophysiologic examination showed that only 2 children had eosinophilic granuloma that occupied the fourth place and was located in the lower segment of the shinbone and upper segment of the arm bone of the left extremities.

Discussion

Analyses of the data achieved revealed that bone cysts most often developed in arm bones ($40.35 \pm 4.59\%$) and thighbones ($34.21 \pm 4.44\%$); they were rare ($p < 0.05$) in shinbones ($9.65 \pm 2.76\%$) and peroneal bones ($7.02 \pm 2.39\%$), while in other bones (elbow bones, spoke bones, collarbones, hipbones and heel bones taken together) they comprised only $8.77 \pm 2.65\%$. It is important, that bone cysts were characterized by selective location in various bones, mainly, their location in the upper segment of the thighbone was nine times more frequent than in the median and lower segments taken together; in the upper segment of arm bones they were 2.5-times more frequent than in the median segment, while in the lower segment not a single case was registered; in peroneal and shinbones no bone cysts were observed in the median segment. In the upper and lower segments of peroneal bones mentioned pathology was equally frequent, while in shinbones lower segment cysts were 4.5- times more frequent. In the 95%-evidence range ($x^2 = 1.12$) this lesion was equally observed both in the left and right sides.

Fibrous dysplasia most frequently was observed in shinbones (34.2%), then came arm bones (23.7%),

next-- thighbones (21%), and in other bones taken together (spoke bones, heel bones, elbow bones, peroneal bones, hand bones, shield bones and pubic bones) fibrous dysplasia was registered in 21% of all the cases. It is also important that fibrous dysplasia was characterized by selective location, i.e. in the upper segment of shinbone it was located more frequent than in the median and lower segments taken together; in the lower segment of arm bones this lesion was not registered; while in the upper segment it was twice as frequent as the median one; fibrous dysplasia of thighbones occurred more often in the distal, than in the upper and median segment taken together. In the 95% - evidence range ($x = 1.73$) fibrous dysplasia was 2-times more frequent for the left side, than for the right side.

Non-osteogenic fibro was the most common lesion of shinbone (77.8%); next came thighbones; and arm bones. It is worth mentioning that non-osteogenic fibroma was also characterized by selective location, mainly, in the lower segment of shinbone it occurred more often (1.8-times) than in the upper one; we did not register it in the upper segment of thighbones, while in arm bones, on the contrary, it was observed only in the upper segment. It was equally found both in the right and left sides.

Analyses of the results of the study revealed that in the 99,9%-evidence range tumor-like lesions of thighbones, arm bones and shinbones in children developed more often than in other bones; in the 95%-evidence range those lesions were located more often in arm bones than in shinbones; in the 95%-evidence range frequency of tumor-like bone lesions in peroneal bones, spoke bones, collar bones, foot and hand bones, shield bones, pubic bones, and hipbones did not differ; peroneal bones represented the exception of the group, as in the 95%-evidence range mentioned lesions occurred more frequently in peroneal bone, than in collar bones, shield bones, pubic bones, hipbones and hand bones.

Lesson ratio for the upper, median and lower segment of the shinbone was 4:1:7 ($x = 0.121$). This ratio for the upper median and lower segments of thighbone was 7:1:2 ($x = 0.058$). Tumor-like bone lesions were observed only in the upper and median segments of arm bones with the ratio of 2:1 ($x = 1.06$).

Tumor like bone lesions in children developed with equal frequency both in the left and right extremities ($x = 0.06$)

References

1. M.V.Volkov, bone disease in children; 2ndEd. Moskow Medicina, 1985-p512
2. Y.V.Lantsman, bone tumors. Tomsk, 1990-p327
3. V.V.Nakachalov, Pathology of bones and joints. Manual.-St.Peterbirg, Sotis,2000-p288
4. Y.N.Solovyov.New nosologies in bone tumor classification.-Archive of Patology, 1998,4,pp57-61
5. N.N. Trapeznikov, L.A. Eryomina,A.T.Amiraslanov,P.A.Sinyukov. Bone tumors. Moskow, Medicina,1986-p304
6. F.Schajowicz Tumors and tumor-like lesions of bone and joints. Pathology, radiologie and treatment. 2ndEd.- N.Y.1981,1994-p648

Частота первичных костных опухолей среди детского населения Грузии

Марина Гудушаури, Рамаз Чихладзе

Кафедра травматологии и ортопедии Тбилисского государственного медицинского университета

Р Е З Ю М Е

Результаты анализа операционного материала детей, леченных по поводу опухолеподобных поражений костей, за период 1981-2000 года показали, что всего зарегистрировано было 172 случая костной кисты, фиброзной дисплазии, неостеогенной фибромы и эозинофильной гранулемы. Опухолеподобные поражения костей чаще наблюдались в плечевой, бедренной и большеберцовой костях. В тоже время, в каждой кости указанные патологии характеризуются определенной избирательной локализацией, что необходимо учитывать при диагностике опухолеподобных поражений костей.

Ключевые слова: *опухолеподобные поражения костей, локализация, детский возраст*