

DIAGNOSTICS OF THE PELVIC BONE SARCOMAS

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ABSTRACT

Due to the low prevalence, the multitude of histological forms of bone and soft tissue sarcomas (0.2-0.6% of all oncological diseases), their diagnosis and treatment are very difficult, poorly studied and still remain the subject of research. Tumor formations of the pelvic bones are characterized by a variety of histological forms, clinical flow and prognosis. In most cases, it has been proven that from qualitative studies of neoplasms in the pelvic bones, primary bone sarcomas are most common, followed by soft tissue sarcomas and metastatic lesions. Using available sources, we found inconsistency in the data on the prevalence of various histological types of pelvic sarcomas.

INTRODUCTION

According to studies, pelvic sarcomas account for 10-20% of bone sarcomas, and include histological types such as chondrosarcoma in adults, Ewing's sarcoma in adult children, and osteosarcoma in adolescents. In a major study from Stanford University by M. Jawad et al. to study the epidemiological characteristics of patients with tumors of the pelvic bones, as well as their histological characteristics, included an analysis of 1185 patients with sarcomas of the pelvic bones from 1987 to 2006, according to the SEER database, the most common chondrosarcoma was found in 31.3%, Ewing's sarcoma in 22, 1%, and osteosarcoma in 19% of cases. At the same time, it is necessary to improve the change in the prevalence of different histological subtypes depending on the age subgroup. In most cases, the drug is a solitary focus (97.9%). It is presented that sarcomas of the pelvic bones are the most unfavorable primo.

Indicators of ability for sarcomas of the pelvic bones according to studies of various studies of various types are reduced to 45%. It should be noted that, depending on the histological characteristics of the tumor. For example, the most unfavorable histological type of sarcoma is osteosarcoma; the 5-year survival rate, according to the authors, ranges from 4 to 32%. At the same time, the 5-year survival rate for chondrosarcoma was estimated from 72 to 92%. In early studies, the survival rate for Ewing's sarcoma was 20-30%, while in later studies there was a significant improvement in 5-year survival rate up to 46%, which may be associated with improvements in multimodal therapy.

The factors influencing survival according to fluidized et al. Are the status of the resection margins and the stage of the tumor process, according to Kawai et al., Tumor

size and type of surgery, while the study by Shin et al. proved the prognostic value of the degree of tumor differentiation. Also, the histological type of tumor and the age and age of ac can be attributed to important prognostic parameters. According to Mankin et al. age under 50 years is an unfavorable prognostic factor for pelvic sarcomas.

Due to the wide variety of pathologies of the pelvic bones, also the almost identical manifestation of neoplasms when using medical imaging methods, the diagnosis of tumors in this area is a form of complexity.

For the purpose of accurate diagnosis, the use of the entire of laboratory-instrumental, radiation, morphological research methods.

Radiation imaging techniques restore a role in the diagnosis of pelvic bone tumors. The variety of histological types of tumors in the bones of the pelvis leads to difficulties to labor to difficulties to kinagic.

Today, multislice computed tomography is the most optimal method for studying tumors of the pelvic bones in comparison with MRI, since it allows one to assess the minimum involvement of the corticus and periosseal reaction, as well as the degree of bone matrix mineralization. In addition, MSCT allows monitoring the collection of histological material, as well as preoperative planning for skeletal bone tumors. At the same time, how is the value of MRI studies in comparison with computer diagnostics in assessing the involvement of soft tissues, bone marrow and neurovascular bundles.

Angiographic examination is still an important stage in the diagnosis of tumors of the pelvic bones, as it allows you to determine the relationship and the relationship of the tumor with large blood vessels, features of the structure and degree of vascularization of the tumor. This information is extremely important when planning the resection of deeply located tumors of the pelvic bones, since large tumors can disrupt the normal location of large blood vessels and alter anatomy. In addition, tumors of this localization are often characterized by the formation of tumor thrombi, the presence of which must be clarified before surgical treatment. Also, a series of angiographs allows one to assess the tumor response to neoadjuvant therapy, and the use of embolization to achieve a significant reduction in tumor size and intraoperative blood loss.

Despite the development of radiation imaging methods, a detailed study of the anatomical prevalence of pelvic bone tumors is still insufficient. Only the complex use of all radiation methods of research makes it possible to assess the real anatomical spread of the tumor. However, in the preoperative period, the prevalence of the tumor process in the pelvic bones is often underestimated.

A number of researchers emphasize the importance of using scanning of skeletal bones, especially in their metastatic lesions, which has shown high sensitivity in the osteoblastic nature of metastases, while its use in osteolytic metastases and multiple myeloma is not informative enough.

Summarizing the results of many studies on the study of PET-CT in the diagnosis of tumors of the pelvic bones, we can affirmatively say that it is the best diagnostic technique. In the diagnosis of most tumors of the pelvic bones, PET-CT using FDG glucose has shown its high sensitivity compared to scanning in assessing the primary tumor, as well as the response to treatment, but the availability and high cost of this method are limiting factors. In addition, it should be borne in mind that the assessment of the tumor response to the previous specific therapy may be misinterpreted due to the phenomenon of a paradoxical increase in the absorption of radiopharmaceuticals of the healing site of the bone at the site of the metastasis, within 6 months, which should also be taken into account when analysis of patient data.

Tateishi U. et al. a relationship was revealed between the uptake of ¹⁸F-FDG and the degree of malignancy of the primary tumor, its proliferative activity, as well as the index of mitosis. At the same time, the relationship between the grade of malignancy and the value of SUV is not fully understood, which is due to the existing inflammatory component in aggressive benign tumors, which often leads to false positive results. According to various authors, in bone tumors, the sensitivity of this method is 93%, specificity is 66%, and soft tissue tumors are 97 and 60%, respectively. The use of PET-CT has shown the best results in the diagnosis of metastatic

lesions of the pelvic bones, especially in metastases of lung cancer (98% and 100%, respectively).

The most important stage of diagnosis is the morphological study, which presents certain difficulties in connection with the anatomical and topographic difficulties of the structure of the pelvis. In addition, in the light of the expanded use of organ-preserving operations, the collection of material for histological examination has its own specifics, since the route of insertion of the instrument should not pass through areas of the bone that are not involved in the oncological process, due to the possibility of further seeding. Also, due to the preservation of the gluteal muscles and rectus femoris during this kind of interventions used for postoperative rehabilitation and stabilization of the prosthesis, the biopsy tract should also not pass through these muscles. According to J. S. Wu, et al, to improve the diagnostic accuracy of histological examination, the biopsy area should include areas free of sclerosis and necrosis, as well as the collection of as many samples and material as possible.

In order to take histological material for research, an open biopsy, core- and trephine biopsy are used. Currently, the main concept of interventional interventions for diagnostic purposes is the transition from open to minimally invasive diagnostic procedures.

An analysis of the available sources showed that there are many methods of percutaneous biopsy of a pelvic bone tumor, the use of which has been little studied from the point of view of scientific methodology and have not been systematized in comparison with the methods used for tumors of the spine and extremities, due to the complexity of the anatomical and topographic structure of the pelvis. Among the methods of radiation imaging used to control the biopsy procedure, multislice computed tomography has shown its effectiveness.

Nevertheless, due to the rarity of this pathology and the variegated histological picture, a single histological study is not enough today, and should be supplemented with an immunohistochemical study, which makes it possible to accurately determine the histo- and organogenesis of the tumor, as well as the presence of other important receptors, to determine the tactics of treatment. selection of targeted drugs and prognosis of the disease.

In addition, IHC plays an important role in the recognition of soft tissue sarcomas, lymphoproliferative and metastatic tumor lesions, and their origin. In the diagnosis of the origin of metastases in the pelvic bone, an important role is played by intermediate filaments of epithelial differentiation - cytokeratins, the expression of which differs between epithelial tissues and have tissue and organ specificity.

Today there is a wide panel of IHC markers such as: SMA, HHF35 z desmin, SMA, HHF35 z myogenin,

MyoD1, myoglobin z, S-100 protein, CD34, EMA z CK, EMA, S-100 z, CK, CD34 z play an important role in determining sarcomas of soft tissue origin.

According to the available data, vimentin expression is observed in osteosarcomas, and some authors have indicated the presence of local expression of cytokeratin and desmin, although these facts have not been widely confirmed. Bone matrix proteins such as osteocalcin, alkaline phosphatase, and osteonectin are also expressed in osteosarcomas, although they can be detected in chondrosarcoma, Ewing's sarcoma and fibrosarcoma. Care should be taken when introducing local expression of various markers, such as S-100, actin, and epithelial membrane antigen.

As for the IHC diagnostics of chondrosarcoma, it should be noted that a number of authors revealed the expression of S-100 and vimentin, as well as Leu-7 and neuron-specific enolase.

According to available studies in Ewing's sarcoma, IHC studies show the expression of CD99 or MIC2. Also, the researchers found that antibodies against FLI1 also have high specificity for Ewing's sarcoma. Depending on neuroectodermal differentiation, tumor cells can express neuron-specific enolase, synaptophysin, and protein S-100.

Genetic studies are extremely important in the diagnosis of pelvic sarcomas, due to the fact that 20-30% of sarcomas have various specific chromosomal abnormalities, which allow not only a definitive diagnosis, but also have the potential to be used as a target for therapy in the future. Molecular diagnostics in bone sarcomas includes such studies as FISH, reverse transcription-polymerase chain reaction, NGS (next generation sequencing) technology. An example of this is the definition of translocation in Ewing's sarcoma and mesenchymal chondrosarcoma, isocitrate dehydrogenase mutation (IDH1 and IDH2) in chondrosarcoma, and MDM2 amplification in paraossal and intramedullary low-grade osteosarcoma.

Due to the complexity of the structure of the pelvis and the limited number of existing devices for the collection of histological material from the bones of a given localization, their improvement and scientifically grounded use is a poorly studied and promising area of oncology. On top of that, the development of algorithms for the diagnosis of pelvic bone tumors, in view of their diversity and similar clinical signs, is an important practical task that requires a rational solution.

REFERENCES

1. Abe K., Yamamoto H., Katsuhiko Hayashi. The usefulness of wide excision assisted by a computer navigation system and reconstruction using a frozen bone autograft for malignant acetabular bone tumors: a report of two cases//BMC. Cancer, 2018; 18: 1036.
2. Andreou D, Harges J, Gosheger G. Interdisciplinary diagnostic and treatment of bone sarcomas of the extremities and trunk // Handchir Mikrochir Plast Chir, 2015; 47(2): 90-9.
3. Ashford RU., Scolyer RA., Bonar SF. The role of intra-operative pathological evaluation in the management of musculoskeletal tumours.// Recent Results Cancer Res, 2009; 179: 11-24.
4. Beadel GP, McLaughlin CE, Wunder JS, et al. Outcome in two groups of patients with allograft-prosthetic reconstruction of pelvic tumor defects. Clin Orthop, 2005; 438: 30-5.
5. Brown TS, Salib CG, Rose PS, et al. Reconstruction of the hip after resection of periacetabular oncological lesions: a systematic review. Bone Joint J, 2018; 100-B: 22-30.
6. Cartiaux O, Docquier PL, Paul L, Francq BG, Cornu OH, Delloye C, Raucant B, Dehez B, Banse X. Surgical inaccuracy of tumor resection and reconstruction within the pelvis: an experimental study. Acta Orthop, 2008; 79: 695-702
7. Delloye C, Banse X, Brichard B, Docquier PL, Cornu O Pelvic reconstruction with a structural pelvic allograft after resection of a malignant bone tumor. J Bone Joint Surg Am, 2007; 89: 579-587.
8. Fiorenza F, Abudu A, Grimer RJ, Carter SR, Tillman RM, Ayoub K, et al. Risk factors for survival and local control in chondrosarcoma of bone. J Bone Joint Surg Br, 2002; 84(1): 93-9.
9. Garcia JG, Martinez A, Filho RJ, Petrilli MT, Viola DC. Epidemiological characteristics of patients with pelvic tumors submitted to surgical treatment. Rev Bras Ortop, 2018; 53(1): 33-7.
10. Gouin F, Paul L, Odri GA, Cartiaux O. Computer-assisted planning and patient-specific instruments for bone tumor resection within the pelvis: a series of 11 patients. Sarcoma, 2014; 2014: 842709.
11. Jawad M.U., Haleem A.A. et al. Malignant Sarcoma of the Pelvic Bones Treatment Outcomes and Prognostic Factors Vary by Histopathology. Cancer, 2011; 1529-1541.
12. Jemal A, Siegel R, Xu J, Ward E: Cancer statistics, 2010. CA Cancer J Clin, 2010; 60(5): 277-300.
13. Jeys L, Matharu GS, Nandra RS, Grimer RJ. Can computer navigation-assisted surgery reduce the risk of an intralesional margin and reduce the rate of local recurrence in patients with a tumour of the pelvis or sacrum? Bone Joint J., 2013; 95-B: 1417-24.
14. Kamal A.F. et al. Outcomes of pelvic resection from malignant pelvic tumors. A case series International Journal of Surgery Open, 2019; 16: 34-39.
15. Kawai A, Huvos AG, Meyers PA, Healey JH. Osteosarcoma of the pelvis. Oncologic results of 40 patients. Clin Orthop Relat Res, 1998, 348:196-207
16. Laitinen M, Parry M, Albergo JI et al. The prognostic and therapeutic factors which influence

- the oncological outcome of parosteal osteosarcoma. *Bone Joint J*, 2015; 97-B: 1698–1703.
17. Langlais F, Lambotte J, Thomazeau H: Long term results of hemipelvis reconstruction with allografts. *Clin Orthop*, 2001; 1(388): 178-186.
 18. Ogura K, Susa M, Morioka H, et al. Reconstruction using a constrained-type hip tumor prosthesis after resection of malignant periacetabular tumors: A study by the Japanese Musculoskeletal Oncology Group (JMOG). *J Surg Oncol*, 2018; 117: 1455-63.
 19. Puchner SE, Funovics PT, Bohler C, Kaider A, Stihsen C, Hobusch GM, et al. Oncological and surgical outcome after treatment of pelvic sarcomas. *PLoS One*, 2017; 12: 1-15.
 20. Sabourin M., D.Biau, A.Babinet et al. Surgical management of pelvic primary bone tumors involving the sacroiliac joint. *Orthopaedics & Traumatology: Surgery & Research*, 2009; 95: 284–292.
 21. Tsuchiya H, Shirai T, Nishida H, Murakami H, Kabata T, Yamamoto N, et al. Innovative antimicrobial coating of titanium implants with iodine. *Journal of orthopaedic science: official journal of the Japanese Orthopaedic Association*, 2012 Sep; 17(5): 595-604.
 22. Umer M, Ali M, Rashid RH, Mohib Y, Rashid HU. Outcomes of internal hemipelvectomy for pelvic tumors: a developing country's prospective. *IJS Oncol*, 2017; 4: 1-5.
 23. Valery PC, Laversanne M, Bray F. Bone cancer incidence by morphological subtype: a global assessment. *Cancer Causes Control*, 2015; 26: 1127–1139.
 24. Wirbel RJ, Schulte M, Mutschler WE: Surgical treatment of pelvic sarcomas: oncologic and functional outcome. *Clin Orthop*, 2001; 190-205.
 25. WHO classification of bone tumours. – In *Pathology and genetics of tumours of soft tissue and bone* / Ed. by Ch. Fletcher, K. Unni, F. Mertens. – Lyon: IARC Press, 2002; 226.