

Action and Diagnosis Protocol for Musculoskeletal Tumors in the Tumor Service of the CCOI Frank Pais

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ABSTRACT

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Introduction

Bone tumors are not common. Statistics indicate an incidence of ten cases of malignant primary bone tumor per million inhabitants per year, while benign tumors are much more frequent. Among benign bone tumors, the most frequent are: Osteochondroma, Enchondroma, Giant Cell Tumor (GCT) and Osteoid Osteoma. In the case of the malignant, the most frequent is multiple myeloma followed by Osteosarcoma, Chondrosarcoma and Ewing's sarcoma. In pseudotumor lesions, the most frequent are: solitary bone cyst, aneurysmal bone cyst and metaphyseal fibrous defect. Musculoskeletal oncology is a multidisciplinary specialty for which the work in our service has not been possible without the joint effort and dedication of orthopedic surgeons, radiologists,

clinicians and pathologists.

Development

Knowing how to diagnose in time and knowing how to guide a patient is on countless occasions the salvation of a life or the preservation of a part of the human body. The simplest classification in terms of tumors, as we all know, is benign or malignant, but as studies on tumors have developed, it has become known of the need for a classification more in line with the current situation in the study of tumors and After multiple attempts we have that the WHO for practical purposes recommends that the following be used [1-10].

Eye Put Who Classify Table

Diagnostic Procedures

Lab tests:

- a) Complete blood count with erythrocyte sedimentation.
- b) Creatinine, Transaminases, uric acid
- c) Glycemia (if necessary).
- d) Serology.
- e) HIV.
- f) C-reactive protein
- g) Calcium and phosphorus in the blood.
- h) Alkaline phosphatase (has prognostic value in tumors that form bone tissue.
- i) Acid phosphatase and PSA (if prostate cancer is suspected).
- j) Protein electrophoresis, Bence Jones protein, Kappa Lambda Index and medullogram (if multiple myeloma is suspected).
- k) Functional thyroid studies [11-20].

Imaging Diagnosis

A. Conventional simple radiology in at least two views. In these you can define:

1. Numbers of bone lesions.
2. Location and situation.
3. Effect of the injury on the bone.
4. Periosteal reaction.
5. Special features.

B. Computerized Axial Tomography (CT): In these the calcifications are demonstrated, the periosteal reaction is appreciated, the extension of the lesion can be assessed, and it is useful for staging as well as digital reconstructions of the injury site can be performed.

C. Angiography: it is used little, but it is useful in vascular lesions, to carry out embolization's, to determine very vascular areas related to the tumor.

D. Scintigraphy: In our environment with Technetium 99 dysphonate and MIBI. It is used to track hidden tumors, look for metastases, and evaluate tumor activity after surgery.

E. Magnetic resonance: It is the most useful technique to appreciate the tumor activity and the intramedullary extension and to soft tissues of the tumor.

F. Biopsy: necessary for the definitive diagnosis [21-30].

a) Closed by needle puncture that can be:

- i. BAAF (Fine Needle Aspiration Biopsy)
- ii. Needle.
- I. Trocar.

b) Openly (with general anesthesia and in a regulated operating room) and can be of two types:

- I. Incisional: a fragment of the tumor is taken.
- II. Excisional: the entire tumor is removed and is indicated in: benign tumors, malignant tumors in which this is the treatment and in painful metastases.
- III. Considerations to take into account when performing the biopsy:

a) Do not make transverse incisions (if the tumor is malignant then it will be necessary to remove the entire incision)

b) Do not go through several compartments (for the same reason above)

c) Carry out careful hemostasis.

d) Remove ischemia before closing.

e) Place the drain if necessary, through the incision.

f) Use a compression bandage.

g) Send samples to microbiology if associated septic process is suspected.

G. Staging (the Enneking system is used)

1. G: histological grade of malignancy.

2. G 0: benign.

3. G 1: low grade malignant.

4. G 2: high grade malignant.

A. T: tumor location.

B. T 0: intracapsular.

C. T 1: intercompartmental. Extracapsular

D. T 2: extra-compartmental.

a) M: presence of metastasis.

b) M 0: no metastasis.

c) M 1: metastasis.

Surgical Procedures

1. Intralesional resection (through the tumor) and

subsequent treatment (curettage and filling with autologous cancellous bone or Bench, hydroxyapatite and PMMA.)

2. Marginal resection (by the reactive zone of the tumor).
3. Wide resection: resection of the entire tumor with a small margin of normal tissue.
4. Radical resection: Amputation of the limb to the level that is necessary as well as the amputation of fingers and joints in the beam, disarticulation in both the upper and lower limbs.
5. Placement of tumor prostheses for proximal femur and knee tumors.
6. Chemotherapy and radiotherapy by the Oncology service [31-40].

Action for the Most Frequent Tumors in the Service

Most Frequent Benign Tumors

A. Osteochondroma: It is carried out en bloc resection including the base to avoid recurrences when:

1. Compressive symptoms appear.
2. Increase in size after the physis is closed.
3. Appearance of intense pain.
4. Presence of calcifications inside [41-50].

B. Osteoid osteoma: The treatment of choice is surgical. If it is stage 1 and pain is controlled with analgesics, observation is recommended and if it is stage 2 and 3, en bloc excision of the tumor including the niche will be performed.

C. Enchondroma: The treatment of choice is surgical by curettage and preferably filling with coral hydroxyapatite with adequate granulometry.

Most Frequent Malignant Tumors

A. Osteosarcoma: Radical surgery with preoperative polychemotherapy is recommended for 8 to 12 weeks, which eliminates up to 90% of micro-metastases and sterilizes the reactive area. After surgery, chemotherapy is continued for 12 to 24 weeks.

B. Giant Cell Tumor: The treatment of GCT is controversial and includes various options such as:

1. Curettage and graft of autologous or homologous bone.
2. Curettage and insertion of polymethylmethacrylate (PMMA).
3. Cryotherapy after curettage.
4. Curetting and washing the cavity with phenol, alcohol, Zinc chloride and hydrogen peroxide, milling the cavity and

inserting PMMA or bone graft.

5. En bloc resection and bone transport with external fixator or tumor prosthesis.
6. Radiotherapy.
7. Embolization of the vessels that feed it [51-60].

In our environment we do not use cryotherapy or lavage of the cavity, radiotherapy is in disuse because it produces sarcomatous degeneration of the tumor and we have no experience in embolization of the vessels.

En bloc resection with transportation guarantees a low incidence of recurrence but causes multiple complications such as infection, graft resorption, pseudoarthrosis, delayed union and fractures: a very long period of time is also required for the patient's recovery. In the case of en bloc resection and insertion of a tumor prosthesis, it is only possible when the GCT is located in the proximal epiphysis of the femur and knee.

We usually use curettage with PMMA insertion, which controls recurrences in between 80 and 90% of cases with much better results than bone graft insertion and also facilitates early ambulation, immediate rehabilitation and social incorporation of the patient in a shorter period of time. We have used amputation in those cases of malignant GCT with soft tissue infiltration or those located in short bones that have not been feasible for another surgery and due to the high risk of metastasizing [61-71].

C. Chondrosarcoma: They are not chemo or radiosensitive, they only require surgical treatment:

- 1) En bloc resection of the tumor and bone transport with external fixator or insertion of a tumor prosthesis.
- 2) Radical surgery:
 - I. Amputation.
 - II. Dislocation.
- 3) Ewing's sarcoma: Chemotherapy + radiotherapy.
- 4) Surgery only in sacrificial bones associated with preoperative chemotherapy to decrease the size of the tumor and make surgery easier.
- 5) Survival at 5 years can be as high as 60%.

D. Multiple myeloma: it is the most common primary malignant bone tumor.

It is the responsibility of Internal Medicine and Hematology, if there are pathological fractures, surgical stabilization by the orthopedic will be needed.

E. Pseudotumor lesions

1. Solitary Bone Cyst: Generally, there is no urgency for treatment, it is important to explain to the parents that it is a benign lesion and the dangers of a fracture or growth retardation if the lesion involves the physis. If a pathological fracture occurs, it is preferable to wait for consolidation since in some cases this causes the cyst to heal.

- a) Curettage and filling: With caution if the lesion is adjacent to the physis.
- b) Non-ossifying Fibroma or Metaphyseal Fibrous Defect: Observation
- c) It is only operated if it is symptomatic or has a risk of fracture (more than 50 to 75% of the diameter of the bone)
- d) Treatment consists of curettage and filling.
- e) Aneurysmal Bone Cyst: Curettage and filling. In our experience we want to point out that the remote but present possibility of the installation of a tumor of another type, including a malignant one, on this type of lesion must be taken into account, which requires strict monitoring.

Conclusion

Establish a protocol for diagnosis and action in the event of a suspected tumor that allows us to evaluate the patient as soon as possible to avoid unnecessary sacrifices. Trains orthopedic surgeons in the management of tumor lesions. Request the competition for related specialties whenever necessary, knowing in advance that teamwork is essential in this area.

Conflict of Interest

None.

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