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*Case report*

# PEComa. About a case.

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**Abstract:** PEComa (perivascular epithelioid cell) is a rare perivascular mesenchymal cell tumor that can appear anywhere in the body. It is uncommon as a primary bone tumor. Our case is a 28-year-old woman with shoulder pain of two months of evolution who suffered a pathological fracture in the proximal humerus. After imaging tests and biopsy, PE Coma was diagnosed. This tumor has a particular immunohistochemistry (IHC): it presents HMN45 + melanic markers and Actin + and S-100 - muscle markers. Our case is treated with extra-articular amputation of the right upper limb. This seems to be the only case of proximal humerus. It is essential to know the IHC markers because they are very characteristic. The patient had phantom limb symptoms and required psychological help.

**Keywords:** PEComa; bone; pathological fracture; amputation.



## 1.Introduction

PEComas are defined as: “perivascular epithelioid cell mesenchymal tumors with distinctive histology and immunohistochemistry” according to the World Health Organization [1]. PEComa is a neoplasm that sometimes behaves as benign but lately there have been more cases with aggressive local growth, as in our case, or even in a metastatic stage at diagnosis [2,3]. This tumor represents less than 1% of musculoskeletal tumors.

Due to its perivascular nature, it is highly vascularized and can appear at any age and sex and be located almost anywhere in the body. Preference for the female sex is unclear [4–5].

The clinical presentation is highly variable and will depend on the place of implantation of the tumor. This can vary from a painless abdominal mass attached to deep planes to shoulder pain without a palpable mass due to an endomedullary growth.

Histologically, they are made up of round, eosinophilic, granulated cells with pleomorphic nuclei that are arranged in the form of epithelium and are always attached to the wall of blood vessels with a thin capsule [2,3]. Immunohistochemistry (IHC) allows us to characterize them and differentiate them from other strains. They are positive for melanocytic markers such as HMB-45 or melan-A, but it differs from

melanoma in which S-100 is negative. In turn, it is positive for muscle markers such as actin or desmin.

Current evidence suggests that radiotherapy is not very effective and chemotherapy is helpful but unfortunately not specific. That makes surgery the main weapon against them. The type of surgery will depend on the location of the main tumor, soft tissue involvement, stage, prognosis, and the patient's perspective and opinion.

## 2. Materials and Methods

We have prospectively followed the case of a malignant PEComa in detail. After a pathologic fracture, several imaging studies are performed. Plain radiography is essential and must be performed in all cases of suspected tumor. Computed Tomography (CT) allows to delimit the lesion and the areas of cortical destruction. With Magnetic Resonance (MR) the tumor presents a hypointense signal on T1 and hyperintense on T2. MRI is also effective in demonstrating the existence or absence of chondral tissue in the tumor and soft tissue involvement, and helps us make a correct differential diagnosis.

The definitive diagnosis is achieved after studying the biopsy. Molecular techniques also help diagnosis and therapeutic approach. The images were taken from the ZFP archive. The data of interest were extracted from the OrionClinic.

A review of the literature was made with the terms "PEComa", "bone", "fracture pathological" until November 12. It is limited to studies in English and Spanish.

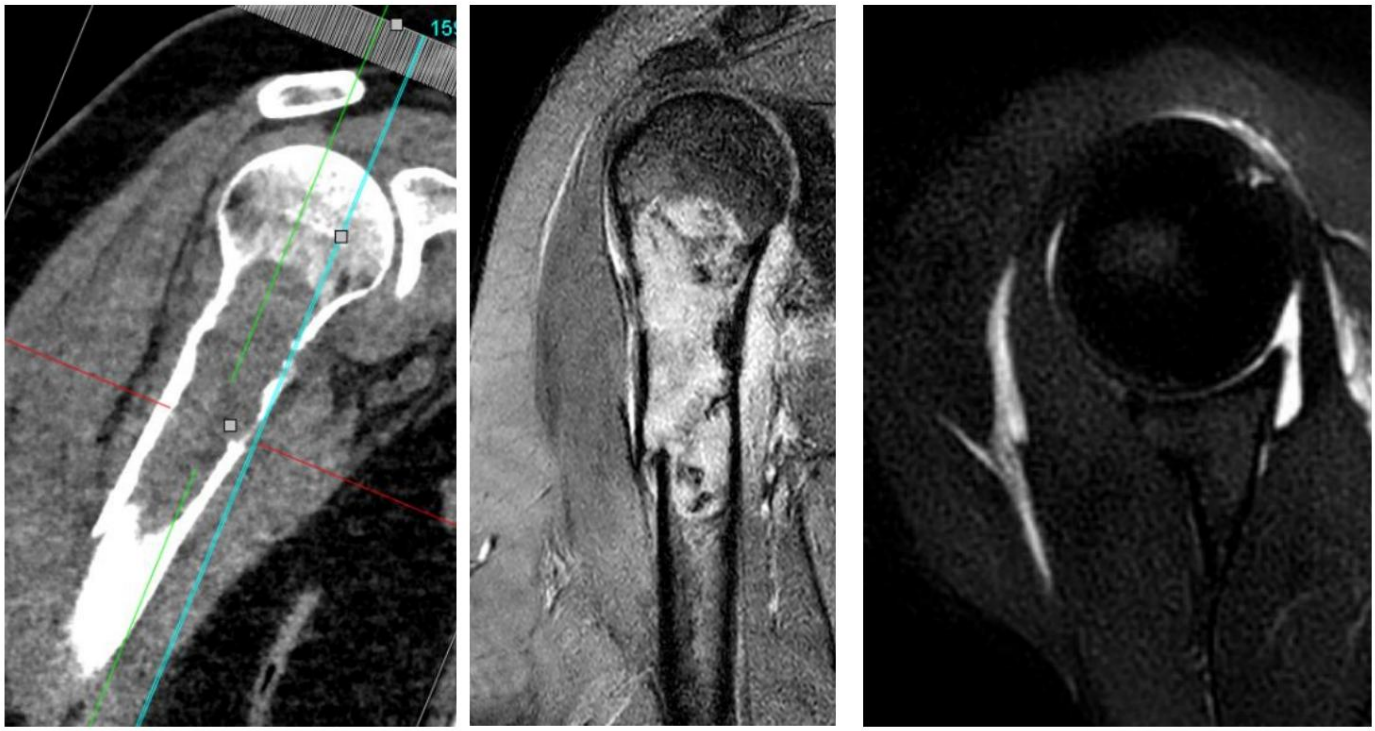
## 3.Results

### *3.1. Presentation of the case*

We present the case of a 28-year-old woman, with no pathological history of interest, who attended the emergency department of her hospital due to pain in her right shoulder after a slight tug from her dog. After performing an X-ray, a pathological fracture of the proximal diaphyseal metaphyseal of the right humerus and an underlying bone with a permeative appearance were evident, suggesting a pathological fracture. As her only history, the patient presented atraumatic pain in said shoulder for two months, which had been treated with analgesia, sling and physiotherapy. He had no fever, B symptoms or infections at any time.

### *3.2. Imaging study* The

same day, the study was extended to CT of the proximal humerus, which the radiologist described as <Permeative pattern of the metaphysodiaphyseal cortex of the upper third of the humerus with an intramedullary mass that causes a spiral pathological fracture. No associated soft tissue mass, bone or chondral matrix, or periosteal reaction>. This suggests aggressive disease. Subsequently, an MRI was performed, which added to the description of the mass characteristics such as <94x30x30mm intraosseous and homogeneous mass, with little soft tissue component, and without the presence of "skip lesions", with well-defined borders and that is captured with a fast and rapid fret. maintained > without plexus invasion but with intimate contact and apparent intra-articular involvement.



(a) (b)

**Figure 1.** Radiological findings at diagnosis. **(a)** The CT shows a permeative pattern of the metaphysodiaphyseal cortex of the upper third of the humerus with an intramedullary mass that causes pathological fracture; **(b)** The MRI shows a well-defined, homogeneous mass, with little soft tissue component, without osteoid or chondral matrix and without the presence of "skip lesions", and which quickly and sustainably captures contrast; **(c)** Axial view of the MRI shows the presence of bruise.

When a tumor with a malignant or atypical appearance is diagnosed, the staging of the tumor should be continued with an extension study. Depending on the suspicion, the tests will be adapted, but in our case a CTAP CT (cervico-thoracic-abdominal pelvic) and a brain MRI were performed where no distant disease was found.

*3.3. pathological diagnosis*

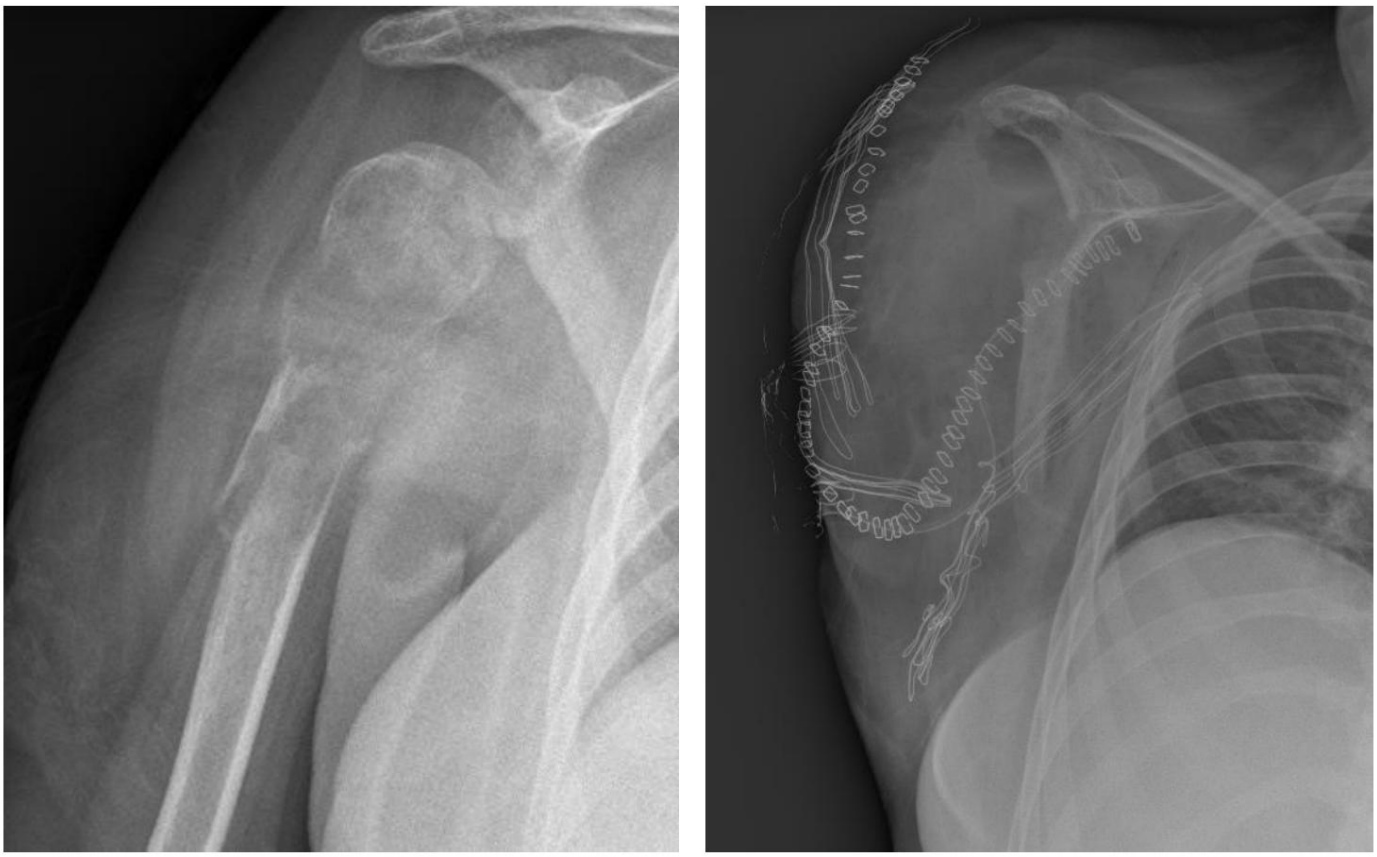
Once it is verified that it is a tumor through the image, the symptoms and the age, the correct procedure is to refer the patient to Reference Centers. There, a Multidisciplinary Tumor Committee assesses the case from the point of view of different professionals to reach the best therapeutic decision. The decision may influence the access point to take the biopsy. Even so, in our case the biopsy was taken at the initial center and a malignant PEComa was diagnosed at the level of the right humerus with no apparent distant spread. Subsequently, he was referred to our hospital for multidisciplinary evaluation and therapeutic strategy.

The biopsy describes an aggressive pecoma. In our particular case, the tumor was positive for HMB-45 and melan-A, and negative for S-100 and CD45. It was also positive for skeletal muscle marker actin or desmin. Given the negative in S-100, which lowered the suspicion of melanoma, the IHC study was extended. Caldesmon markers and progestogen receptors were also positive while the estrogen receptor is negative.

*3.4. Therapeutic*

*decision* Taking into account the rapid progression of the tumor after the pathological fracture and the good general condition of the patient, the Multidisciplinary Committee on Sarcomas and Musculoskeletal Tumors decided on a surgical intervention for wide excision of the affected area. This decision was made jointly with the patient and family, who attended the committee in person. This practice is being put into practice with the most borderline cases to give transparency to the process.

The surgery consisted of an extra-articular disarticulation of the right shoulder with en bloc resection. At the moment, he has not started radiotherapy or chemotherapy. The patient had post-surgical pain and phantom limb syndrome for several days.
A team of psychologists and psychiatrists was made available to them, as well as advice from the Pain Unit.



(a) **(b)**

**Figure 2.** Preoperative and postoperative plain radiographs. **(a)** Last radiograph prior to the intervention. Osteopenia of the humeral epiphysis due to immobilization. Appearance of progression; **(b)** Result after wide resection and disarticulation of extra-articular man.

**4.Discussion**

PEComa is a tumor that can present as benign or malignant, in addition to the fact that its location can vary, so the bibliography for specific locations is scarce and heterogeneous. In our case, a wide resection was decided given the age of the patient and the anatomopathological malignancy of the tumor. Possibly a local resection with a tumor prosthesis would not have been a bad option either, given the data on life expectancy at diagnosis of these malignant tumors. However, given that chemotherapy and radiotherapy are not fully established, surgery was our greatest weapon against the tumor and extra-articular amputation offered us the option of giving us a greater margin of safety, especially since it is a pathological fracture.

Due to its perivascular nature, it is a highly vascularized tumor that can appear at any age, sex, and location [5-13]. Preference for the female sex is not clear in published studies. In Jingyu et al's review of bone PEComas in 10 female and 10 male cases, there were no differences between the malignant and benign groups [4]. On the contrary, in the article by Cuevas et al where they talk about a case of retroperitoneal PE Coma, they report having a significant p of avidity for the female sex [5].

In the search for cases in the bibliography and limiting the search to bone and malignant PEComas, we found 5 cases in the lower limbs [7-11], 1 case in the humerus [4], and 3 cases in the spine [8] and pelvis [12, 13]. In all cases they had pain at diagnosis. Imaging studies found damage to the cortex with rupture and a soft tissue mass.
Three of the cases had metastasis at diagnosis [4, 8, 9] and were treated with chemotherapy and/or radiotherapy with or without local resection depending on the functional compromise that involved resection in the location; but too aggressive surgical techniques were not used.

Wide resections were performed in the following cases. In an isolated case of fibula in which disease-free survival was reported [7]. In another it is an acetabulum in which a hemipelvectomy is performed but after months it metastasizes [12]. In two other cases it was a tumor of the distal femur and the patient was free of disease [10, 11].

The case with the most similar location is a woman with a pathological fracture of the distal humerus [4] who is treated with incisional biopsy, neoadjuvant chemotherapy, and wide resection. The patient survived well but had metastases at diagnosis, while in our patient the extension tests were negative.

In summary, there is little evidence on the most appropriate treatment due to the low prevalence of the tumor, the variability of presentation, and the type of patient it affects. Broadly speaking, the conclusion is reached that the best resource is surgical treatment with wide resection, which can be curative in some cases or maintain the disease in remission for years. If this is not possible, cytoreductive surgery can also prolong the survival of some patients. This can be complemented by adjuvant chemotherapy, or in the case of finding specific therapeutic targets, immunotherapies. Radiotherapy will be another tool, along with chemotherapy, in cases where the resection does not achieve free edges.

It was explained to the patient that due to the fracture and the nature of the tumor, local control surgery did not imply total control over the distant spread of the tumor.
There are not many data on whether amputation increases survival as it is an infrequent tumor, there is little bibliography and evidence.

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