Sacral Chordoma: Report of a Rare Malignant Neoplasm

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Cordoma Sacral: Relato de uma Rara Neoplasia Maligna

Cordoma Sacro: Informe de una Rara Neoplasia Maligna

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ABSTRACT

Introduction: Chordoma is a type of sarcoma, a primary bone malignancy that originates from the notochord and is located on the spinal axis between the clivus and the sacrum. The first description of this pathology occurred in 1857. Patients between 40 and 60 years old are the most affected according to the disease's epidemiology, the main site involved is the sacral/coccygeal region. The clinical condition is variable depending on the site affected, with generally nonspecific symptoms, delaying the diagnosis made by biopsy. Among the treatment options, surgical resection with margins is currently the main method, and may be associated with radiotherapy or radiosurgery when necessary; the most common metastatic sites are lungs, bones, liver and local lymph nodes. **Case report:** A 62-year-old female patient had pain in the coccygeal region, worsening while sitting and the appearance of a nodular lesion with progressive growth, diagnosed as a chordoma three years later, after biopsy of the lesion. Due to the extensive lesion, initially she was submitted to chemotherapy and radiotherapy for cytoreduction, but because of the poor response, she was successfully submitted to sacralectomy, however, dehiscence of the surgical wound was detected, and the patient underwent a new approach; since then, no recurrence in the clinical follow-up. **Conclusion:** Apparently, it is clear the necessity for further investigations on chordoma, a rare tumor with poor response to non-surgical treatments, in order to improve the chemotherapy for this potentially deforming neoplasm.

Key words: bone neoplasms; chordoma; sacrococcygeal region; case reports.

RESUMO

Introdução: O cordoma é um tipo de sarcoma cuja malignidade óssea primária se origina da notocorda e se localiza no eixo espinhal entre o clivus e o sacro. A primeira descrição dessa patologia foi em 1857. Na epidemiologia da doença, são mais afetados pacientes entre 40 e 60 anos, sendo o principal sítio de acometimento a região sacrococcígea. O quadro clínico é variável conforme o local acometido com sintomas geralmente inespecíficos, gerando atrasos no diagnóstico feito por biópsia. Entre as opções de tratamento, o principal método é a ressecção cirúrgica com margens, que pode ser associada à radioterapia ou à radiocirurgia quando necessário; os sítios de metástases mais comuns são pulmões, ossos, fígado e linfonodos locais. **Relato do caso:** Paciente, sexo feminino, 62 anos, iniciou com quadro de dor em região coccígea com piora ao sentar-se e surgimento de lesão nodular com crescimento progressivo recebendo diagnóstico de cordoma, após biópsia da lesão, depois de três anos. Em razão da lesão extensa, optou-se inicialmente por tratamento com quimio e radioterapia para citorredução. Pela pouca responsividade, foi submetida ao tratamento de sacralectomia com sucesso, porém apresentou como complicação deiscência de ferida operatória e necessidade de reabordagem, desde então sem recorrência no seguimento clínico. **Conclusão:** Assim, evidencia-se a necessidade de novas pesquisas sobre o cordoma, um tumor raro e de baixa responsividade aos tratamentos não cirúrgicos, visando a melhorar a terapêutica quimioterápica dessa neoplasia potencialmente deformante.

Palavras-chave: neoplasias ósseas; cordoma; região sacrococcígea; relatos de casos.

RESUMEN

Introducción: El cordoma es un tipo de sarcoma, una malignidad ósea primaria que se origina en la notocorda y se localiza en el eje espinal entre el clivus y el sacro. La primera descripción de esta patología fue en 1857. En la epidemiología de la enfermedad, los pacientes entre 40 y 60 años son los más afectados, siendo el principal sitio de afectación la región sacrocoxígea. El cuadro clínico es variable según el sitio afectado, con síntomas generalmente inespecíficos, lo que provoca retrasos en el diagnóstico realizado mediante biopsia. Entre las opciones de tratamiento, la resección quirúrgica con márgenes es actualmente el principal método, pudiendo asociarse a radioterapia o radiocirugía cuando sea necesario; los sitios más comunes de metástasis son los pulmones, los huesos, el hígado y los ganglios linfáticos locales. **Informe del caso:** Paciente, sexo femenino, de 62 años inició con dolor en la región coccígea, empeorando al sentarse y aparición de una lesión nodular con crecimiento progresivo, recibiendo diagnóstico de cordoma, luego de biopsia de la lesión, después de tres años. Debido a la extensión de la lesión optó inicialmente por tratamiento con quimio y radioterapia para citorreducción, por la poca reactividad fue sometida con éxito al tratamiento de sacralectomía, pero presentó como complicación dehiscencia de la herida quirúrgica y necesidad de reabordaje. Desde entonces sin recurrencia en el seguimiento clínico. **Conclusión:** Por lo tanto, es evidente la necesidad de seguir investigando sobre el cordoma, un tumor poco frecuente con escasa respuesta a los tratamientos no quirúrgicos, con el fin de mejorar la terapia de quimioterapia para esa neoplasia potencialmente deformante.

Palabras clave: neoplasias óseas; cordoma; región sacrococcígea; informes de casos.

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INTRODUCTION

Chordoma is a type of sarcoma, a primary bone malignancy that originates from the notochord between the clivus and the sacrum[1-6]. This pathology was first described in 1857 when vacuolated or bubbly cells were found in histopathology and the term physaliphorous was created (the Greek word "*physaliphorous*" meaning bubbles). The term chordoma was not introduced until the 1890's after the notochord hypothesis has been postulated[2]. The epidemiology indicates the peak age of presentation between 40 and 60 years and the main site (50%) is the sacrococcygeal region, followed by skull and vertebral bodies[1,6,7].

The clinical presentation depends on the site affected. The initial symptoms are usually nonspecific which contributes to late diagnosis[2] made with fine needle aspiration or core needle biopsy. As there is risk of metastasis, the tumor should be resected *en bloc*[2]. Brachyury is the transcription factor considered a sensitive diagnostic marker and specific for this tumor[6]. The differential diagnosis is critical as it is based in multiple benign and malignant entities.

The main treatment option is surgical resection with wide margins that can be associated with radiotherapy or radiosurgery if applicable[2]. The most common metastatic sites are lungs, bones, liver and local lymph nodes[6] not identified in the present case. According to the World Health Organization (WHO), there are four histological subtypes of chordomas: conventional, chondroid, dedifferentiated and poorly differentiated[6,8]. The most common is the classic chordoma[6].

The objective of the article is to reaffirm the necessity of more pathological studies and new or additional alternative treatment therapies to improve the therapeutic response and reduce invasive procedures and its complications.

The Institutional Review Board (IRB) of "*Hospital de Clínicas da Universidade Federal do Triângulo Mineiro (UFTM)*" approved the study, report number 5,399,200 (CAEE (submission for ethical review): 55707222.3.0000.8667) in compliance with Resolution 466, December 12, 2012 of the National Health Council[9].

CASE REPORT

Female 62-year patient, divorced, a retired physical education teacher with progressive pain at coccygeal region while seating since mid-2018. No former comorbidity, except osteoarthrosis and brain aneurysm clipping, ex-smoker (15 pack-year), no alcohol use history.

Sought orthopedist in 2021 with worsening of sacrococcygeal pain without irradiation and growth of lesion in the previous year associated with loss of 4 kilos in six months and approximately 10-cm ulcerated lesion in that area (Figure 1). Tomography and scintigraphy were requested to determine staging with counterindication of magnetic resonance imaging due to metal clipping in the central nervous system (CNS), eventually suggestive of chordoma.

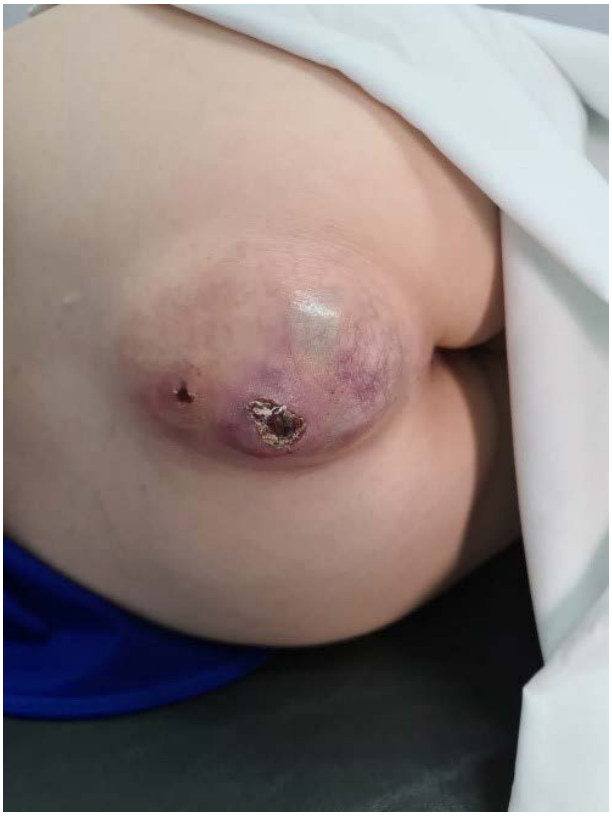

Figure 1. Approximately 10 cm ulcerated tumor lesion. Uberaba (2020)

The patient was evaluated by coloproctologist who prescribed timely oncologic screening for colorectal cancer since the total abdomen tomography failed to reveal any gastrointestinal compromise (coccyx-centered voluminous mass with heterogeneous enhancement and lobulated well-defined contours, destroying several segments of the sacrum, measuring 11.2 x 10.5 x 7.8 (Figure 2), invading the presacral region without cleavage plane to low rectum, and posterior area, without cleavage plane with the skin, restricted to the bones).

The diagnosis of chordoma was later confirmed by biopsy of the lesion (malignant neoplasm with physaliphorous/bubbly cytoplasm cells in lobules and amidst abundant myxoid matrix). Scintigraphy showed hyper-uptake of L3/L4/L5; chest and abdomen tomography without lymphadenomegaly or metastases. She was referred to chemotherapy and radiotherapy due to the extension of the lesion and initially inoperable.

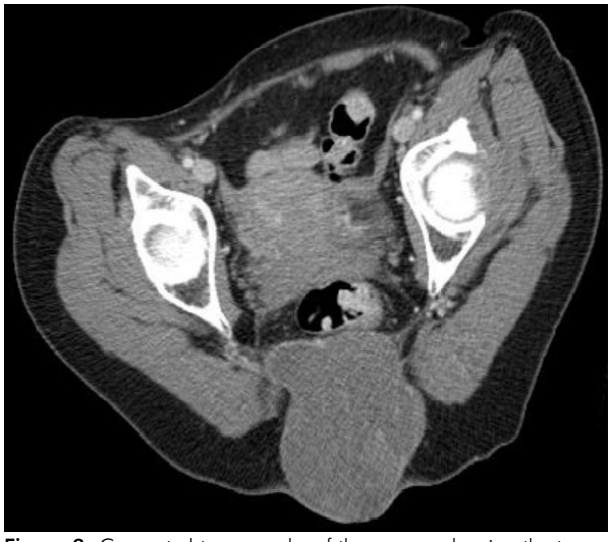

Figure 2. Computed tomography of the sacrum showing the tumor lesion 11.2 x 105 x 7.8 cm

The patient initiated the chemotherapy regimen with Imatinib 800 mg/day (Glivec), in addition to conformational external radiotherapy at 50Gy/25 fraction on the sacral region in March 2021. After two months of treatment, a new tomography of the pelvis revealed discreet reduction of the initial dimensions. During the treatment, eyelid edema, diarrhea and fecal incontinence were found as side effects.

Due to poor response to the treatment, regardless of the risks, sacrectomy joint surgical approach – orthopedy and gastrointestinal – conducted by the orthopedist but assisted by the gastrointestinal team (GIT) was agreed upon because of the extension of the resection and risk of rectosigmoid lesion. The surgery was performed on June 28, 2021 after discontinuation of Imatinib. After the procedure, dehiscence of the surgical wound occurred, needing debridement, re-suture and further myocutaneous flap (Figure 3).

With good evolution of the surgical wound, no signs of local relapse were found so far. Since then, a new radiologic screening was performed and oncologic follow-up continues.

DISCUSSION

Because of its insidious nature and slow growing, chordomas appear in the vertebral body, mainly in the spinal cord or nerves and paraspinal soft tissues[3,6,7]. The patient reported the onset and worsening of the symptoms four years before the diagnosis, ratifying the characteristics of its evolution as reported in the present article.

The literature shows that metastases are infrequent and account for 30% of sacrococcygeal chordomas[5-7]. The screening did not reveal any secondary lesions.

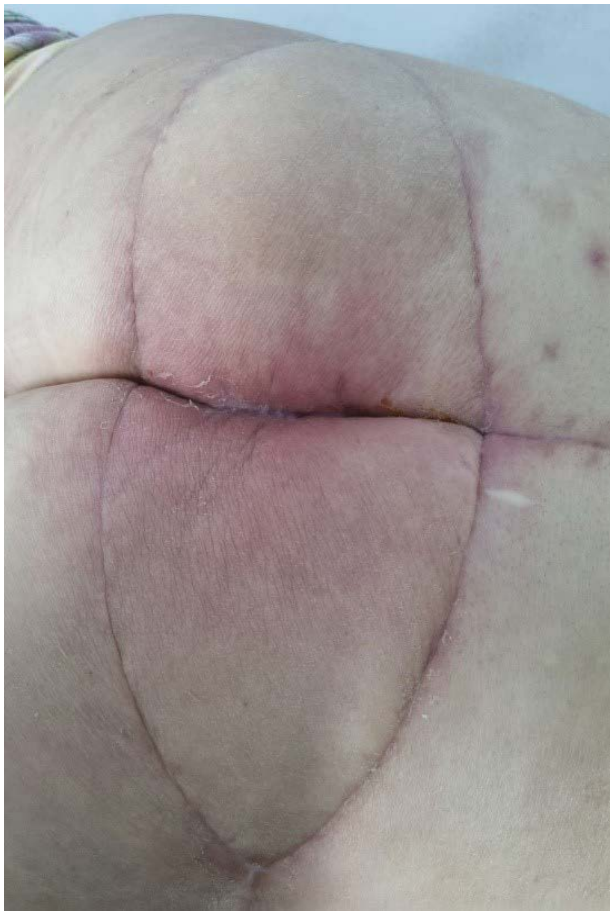

Figure 3. Post-resection and myocutaneous. Uberaba (2021)

Computed tomography revealed lytic bone destruction and/or soft tissue mass that occasionally contains calcifications in 30% to 70% of the cases[7]. T1 weighted images (Magnetic Resonance Imaging) showed isotense or slightly hypotense chordomas compared to the muscle and in T2, hypertense at the muscle. Chordomas may occasionally present reduced absorption or normal distribution of the isotope according to bone scyntigraphy[7].

There was hyper-uptake of L3, L4, L15 at scintigraphy in the present case and radical *en bloc* resection is the treatment of choice associated with high beam radiation photons for residual or recurrent disease[7]. However, due to the tumor size and risks associated with the procedure, cycles of chemotherapy and radiotherapy were initially prescribed to reduce the tumor and facilitate resection. Systemic therapies are indicated for surgery or radiotherapy uncontrolled advanced progressive disease adjusted to clinical symptoms[8].

Sacral tumors have a complex anatomy making resections technically difficult. Unidirectional approaches are frequently combined for correct exposure, but complications as loss of intestinal, bladder and sexual functions may appear as consequences of the surgery[4,7].

The patient complained of urinary and fecal incontinence and flatulence needing rehabilitation physiotherapy.

Cytotoxic chemotherapy with satisfactory response to the treatment of advanced sarcomas of soft and bone tissues is barely relevant in chordomas[5,8]. Tyrosine-kinase inhibitor Imatinib has been utilized due to the increasing identification of druggable molecular targets as beta receptor platelet-derived growth factor (PDGF), phosphoinositide 3-kinase (PI3K/mTOR), epidermal growth factor receptor (EGFR), vascular endothelial factor growth (VEGF) and tyrosine-protein kinase Met (PTKs-MET). However, these agents have poor response in chordomas[8]. Imatinib (Glivec) was utilized in this case with double dose for two months with unsatisfactory response and discontinued due to possible surgical management.

These tumors are radiation-resistant, but some studies report that subtotal excision with radiotherapy was better than subtotal excision alone to extend disease-free survival. The minimal effective dose ranges between 60 and 65 Gy[7]. A reduction of at least 30% of the tumor longest diameter is considered a satisfactory clinical response[3]. After two months of clinical treatment, a slight reduction was reported, which is clearly unsuccessful despite the reduced dose compared with the literature. This option was meant to reduce the potential locoregional damage due to the proximity to the intestine.

Surgical resection *en bloc* is the gold-standard treatment for this pathology[6]. There was no compromise of the digestive tube in the present case. Surgical resection with wide margins is an important prognostic predictor and rate of local and remote[3,4,6,10] relapse. Postoperative complications are not rare ranging from 40% to 60% of the cases with infection of the surgical site, wound dehiscence and presence of sacral hernia[4,10]. The patient had dehiscence of the surgical wound after surgery needing debridement, re-suture and myocutaneous flap later, revealing the great morbidity related to the condition and multiple complications that may appear after surgery.

More than often, patients with this neoplasm who are prescribed surgical approach need long hospitalization and multiple interventions to resolve them[10].

CONCLUSION

Chordoma is a rare tumor with few additional information found in the literature. The treatment options available and adopted with the patient and due to poor response to non-surgical treatments, it is clear the relevance of new studies to improve the chemotherapy proposed for this potentially deforming neoplasm to prevent new patients from very common complications arising from surgical approach.

The present report is useful to reaffirm the necessity of more studies to reduce hospital admissions, costs and the morbidity of future patients.

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CONTRIBUTIONS

Rafael Gonçalves Zimmer and Isadora Lyrio Stábille contributed substantially to the study design, analysis and/or interpretation of the data, wording and/or critical review. Francine Ribeiro Potros and Adriana Batista Alves Martins contributed to the wording and/or critical review. All the authors approved the final version to be published.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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