INTRODUCTION

Breast cancer is the second most frequent malignant tumor in the world, being the most common among women and the leading cause of death by cancer in this population. It usually grows slowly, however, depending on extrinsic and intrinsic characteristics, evolution may be more aggressive, with greater potential for dissemination. In these cases, the axial skeleton is the most frequent site of metastases, although pulmonary, hepatic and cerebral assailment are common. As a consequence, some patients with spinal metastases may develop secondary pain or neurological deficit to pathological fracture and/or direct compression of the spinal cord. The best treatment of spinal metastases involves the approach of several specialists. Although the therapeutic strategies used lately have been more aggressive and have shown better results, they...
remain with the palliative purpose of reducing morbidity and improving the patients’ quality of life.3-5 Surgical treatment is specifically indicated in situations such as mechanical instability, progressive tumor growth despite clinical treatment, uncontrolled pain despite medications, and significant or progressive neurological symptoms.4,6 Different surgical techniques can be chosen to treat spinal metastatic lesions, and subsequent approaches with decompression and instrumentation for stabilization and corpectomy with implant replacement are commonly carried out.7 The choice of method considers its practicality in relation to the affected column region, once not every level is equally accessible, the objectives of each procedure, and the familiarity of the surgeon with the various techniques.7 Although surgical therapy of spinal metastases has been widely adopted, the literature still lacks results according to breast cancer histopathology and the influence of negative prognostic variables, such as visceral metastases, surgical complications and advanced age at diagnosis.4,8 Accordingly, this study aims to investigate the clinical and radiological parameters of patients with breast metastasis in the spine who underwent surgical treatment by posterior approach, as well as to identify post-treatment complications.

MATERIALS AND METHODS

This is a descriptive and retrospective study of a prospective database, including 44 patients diagnosed with breast tumor metastasis in the spine, who were operated by the Orthopedics—Spinal Surgery team of the Hospital das Clínicas of the Ribeirão Preto Medical School, USP, from 2005 to 2017. The research project was approved by the Research Ethics Committee of the institution, including the exemption from the informed consent form (protocol HC 354/2016—CAAE: 82389518.0.0000.5440). The authors declare no conflict of interest regarding this article. The inclusion criteria consisted of patients diagnosed with primary malignant breast tumor, with histopathological confirmation, submitted to posterior surgery for the treatment of spinal metastases, of both sexes, of any race, and aged over 18. Patients under the age of 18, with another primary malignant tumor, operated by an anterior or combined approach, and non-diagnosed with spinal metastasis, were excluded from the study.

Data were collected by researchers from the Medical Archiving Sector (SAME) of the hospital, and information from medical records and imaging exams were used. Clinical assessment included sex; the patient’s age at the time of diagnosis; time between the secondary initial symptom to spinal metastasis and imaging diagnosis; time between the breast tumor diagnosis and the metastasis in the spine; neurological manifestations classified by the Frankel scale;8 surgical approach used; postoperative complications; and need for surgical reapproach. Radiological assessment involved the study of simple radiography, computed tomography and magnetic resonance exams, and the morphopathological characteristics of the lesions were studied: level of metastasis in the spine and affected portion of the vertebra. The parameters were stored in a spreadsheet and studied with Microsoft Excel, and the results were presented as percentages, means and medians.

RESULTS

Of the 44 patients evaluated, 41 (93.2%) are women and 3 (6.8%), men. Mean age at diagnosis was 56.79, ranging from 33 to 94 years. The time between the initial symptom in the spine and the confirmation of the diagnosis of metastasis by magnetic resonance exam varied from 1 day to 3.6 years, with a mean time of 7 months, and median of 45 days. In six patients (13.6%), the diagnosis of spinal metastasis preceded the diagnosis of primary tumor. Forty-three percent (n = 19) of the individuals presented secondary neurological deficit to spinal assailment, either by fracture or by spinal cord and/or direct root compression. To classify these alterations, the Frankel scale was used in the pre and postoperative period, and we observed that 22.7% (n = 10) of the patients improved their postoperative deficit, and 2.2% (n = 1) worsened neurologically after the procedure. It was not possible to evaluate these data in two patients due to severe adverse events.

Regarding the surgical procedures used, all 44 patients underwent treatment by the posterior approach. In 19 (43.1%) patients, decompression and posterior fixation with pedicular screws were performed (Figure 1), whereas 16 (36.3%) patients underwent decompression and posterior fixation with pedicular screws associated with corpectomy and replacement with an intersomatic device filled with bone cement (Figure 2). In addition, kyphoplasty was the chosen surgical procedure in nine (20.4%) patients.

Eight (18.1%) patients presented postoperative complications: extradural hematoma (4.5%, n = 2), cerebrospinal fluid leak (4.5%, n = 2), infection (9%, n = 4), surgical wound dehiscence (2.2%, n = 1), seroma formation (2.2%, n = 1), and neurological deficit (2.2%, n = 1); and six (13.6%) patients required surgical reapproach to treat complications related to the first procedure: hematoma or seroma drainage (6.8%, n = 3); dressing in the operating room (6.8%, n = 3). Other seven (15.9%) patients underwent a new procedure due to tumor recurrence. Of the eight patients who presented postoperative complications, six (75%) were submitted to decompression, corpectomy, replacement with intersomatic device and fixation with pedicular screws, while two (25%) were subjected to decompression and fixation. Patients who chose the kyphoplasty procedure did not present complication. The spine level most affected by metastases was the thoracic, in 86.3% of the cases (n = 38), followed by the lumbar (25%, n = 11), cervical (13.6%, n = 6) and sacral (9%, n = 4); and the posterior portion of the vertebrae was preferably affected (65.9%, n = 29) if compared with the anterior portion (43.1%, n = 19).

DISCUSSION

Although retrospective, the study adequately assessed the patients, with a thorough description of the information from the database in the Medical Archiving Service (SAME), thus offering significant conclusions. Most of the patients included in the study were women with a mean age of 56.79 at the time of diagnosis, ranging from 33 to 94 years.
The clinical and radiological presentation of patients with breast metastasis lesions in the spine is variable, similar to that described in the literature, except that the posterior portion of the vertebrae was more affected than the anterior portion in the sample of this study. Although surgical treatment by posterior approach does not aim to cure the underlying disease, it may have favorable results, improving the quality of life and neurological prognosis, with higher complication rates in major procedures.
REFERENCES

1. Instituto Nacional de Câncer (Brasil). Câncer de Mama [Internet]. Brasília: [cited 2017 Apr 10]. Available from: https://www.inca.gov.br/tipos-de-cancer/cancer-de-mama
2. Walcott BP, Cvetanovich GL, Barnard ZR, Nahed BV, Kahie KT, Curry WT. Surgical treatment and outcomes of metastatic breast cancer to the spine. J Clin Neurosci. 2011;18(10):1336-9.
3. Conte PF, Bengala C, Guameri V. Controversies of chemotherapy for the treatment of metastatic breast cancer. Eur J Cancer Suppl. 2007;5(1):11-6.
4. Scuibba DM, Goodwin CR, Yurter A, Ju D, Gokaslan ZL, Fisher C, et al. A Systematic Review of Clinical Outcomes and Prognostic Factors for Patients Undergoing Surgery for Spinal Metastases Secondary to Breast Cancer. Global Spine J. 2016;6(5):482-96.
5. Oliveira AV Jr, Bortoletto A, Rodrigues LCL. Avaliação do tratamento cirúrgico nos pacientes com metástase vertebral secundária ao carcinoma de mama. Coluna/Columna. 2012;11(3):226-9.
6. Wu AS, Fourney DR. Evolution of treatment for metastatic spine disease. Neurosurg Clin N Am. 2004;15(4):401-11.
7. Molina C, Goodwin CR, Abu-Bonsrah N, Elder BD, De la Garza Ramos R, Scuibba DM. Posterior approaches for symptomatic metastatic spinal cord compression. Neurosurg Focus. 2016;41(2):E11.
8. Shehadi JA, Scuibba DM, Suk I, Suki D, Maldau MV, McCutcheon IE, et al. Surgical treatment strategies and outcome in patients with breast cancer metastatic to the spine: a review of 87 patients. Eur Spine J. 2007;16(8):1179-92.
9. van Middendorp JJ, Goss B, Urquhan S, Atresh S, Williams RP, Schuetz M. Diagnosis and Prognosis of Traumatic Spinal Cord Injury. Global Spine J. 2011;1(1):1-6.
10. Perrin RG, Laxton AW. Metastatic spine disease: epidemiology, pathophysiology, and evaluation of patients. Neurosurg Clin N Am. 2004;15(4):365-73.
11. Tokuhashi Y, Matsuzaki H, Oda H, Oshima M, Ryu J. A Revised Scoring System for Preoperative Evaluation of Metastatic Spine Tumor Prognosis. Spine (Phila Pa 1976). 2005;30(19):2186-91.
12. Costa J, Andrade A, Martins J, Berhanu N, Rodrigues J. Tratamento das metástases vertebrais. Rev Port Ortop Traum. 2014;22(4):350-9.
13. Klimo P Jr, Schmidt MH. Surgical Management of Spinal Metastases. Oncologist. 2004;9(2):188-96.
14. Korukian M, Jesus-Garcia R, Ishihara H, Ponte FM, Viola DCM. Tratamento das metástases do tumor de mama na coluna vertebral. Rev Bras Ortop. 2006;41(4):116-21.
15. Algra PR, Heimans JJ, Valk J, Nauta JJ, Lachniet M, Van Kooten B. Do Metastases in Vertebrae Begin in the Body or the Pedicles? Imaging Study in 45 Patients. AJR Am J Roentgenol. 1992;158(6):1275-9.