



Original Article

Epidemiological characteristics of patients with pelvic tumors submitted to surgical treatment[☆]



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ABSTRACT

Objective: Describe the epidemiological profile of patients with primary or secondary neoplastic lesions in the pelvis who required a surgical procedure such as hemipelvectomy.

Methods: This study retrospectively evaluated 69 patients located in the database of a São Paulo educational institution, subject to surgical hemipelvectomy treatment between January 1990 and December 2013. All patients had previous diagnosis of bone tumor (primary or metastatic) in the pelvis (ilium, ischium, pubis, and/or sacrum).

Results: Analyzing the data obtained in this study, it was observed that these are partly similar to those found in the literature, with primary bone malignancies as the main diagnosis; general injuries affecting the pelvic area I (pelvic bone) and its most frequent complication, infection. The differences are mainly due to rarity of the bone tumors evaluated in this study, and the type of surgical procedure in question, which is even more unusual.

Conclusion: Building a picture that conveys the reality of each diagnosis and that indicates which characteristics of these patients would better resemble an absolute or relative indication for the realization of hemipelvectomy is harder by the rarity of these cases.

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Características epidemiológicas dos pacientes com tumores pélvicos submetidos a tratamento cirúrgico

RESUMO

Objetivo: Traçar o perfil epidemiológico dos pacientes com lesões neoplásicas na pelve, primárias ou secundárias, para as quais foi necessário procedimento cirúrgico do tipo hemipelvectomia.

Palavras-chave:

Hemipelvectomia

Osteossarcoma

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Neoplasias ósseas
 Perfil de saúde
 Estudos retrospectivos

Métodos: Foram avaliados, retrospectivamente, 69 pacientes localizados no banco de dados de uma instituição de ensino de São Paulo, submetidos a tratamento cirúrgico tipo hemipelvectomy entre janeiro de 1990 e dezembro de 2013. Todos os pacientes apresentavam diagnóstico prévio de tumor ósseo (primário ou metastático) na pelve (ílio, ísquio, púbis e/ou sacro).

Resultados: Ao analisar os dados obtidos no presente estudo, observou-se que esses são em parte semelhantes aos encontrados na literatura mundial, apresentam como principal diagnóstico as neoplasias malignas ósseas primárias. Em geral, as lesões acometeram a zona I pélvica (osso ilíaco) e a complicação mais frequentemente observada foi a infecção. As diferenças encontradas são devidas principalmente à raridade dos tumores ósseos avaliados nesses estudos e ao tipo de procedimento cirúrgico em questão, esses ainda mais incomuns.

Conclusão: Construir um panorama que transmita a realidade de cada diagnóstico e indique quais as características que esses pacientes apresentam que mais se aproximariam como indicações relativas ou absolutas para o procedimento de hemipelvectomy encontra na raridade desses casos o seu maior obstáculo.

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Introduction

Tumor lesions in the pelvis are rare; they may represent primary bone tumors (sarcomas), secondary tumors (bone metastases), or soft tissue neoplasms that affect the pelvic bones by contiguity. Primary pelvic sarcomas usually present a worse prognosis when compared with the same tumor in a non-pelvic topography.¹

Pelvic tumor surgeries are more complex than those of the appendicular skeleton. At diagnosis, pelvic tumors are usually larger in size; the topographic anatomy of the region is complex, and tumors are usually intrinsically related to neurovascular structures and the genitourinary and intestinal tracts. Due to the rarity and unpredictability of pelvic tumors, the learning curve for hemipelvectomy surgery is quite steep when compared to other orthopedic surgeries.

Originally, hemipelvectomy designated amputation of the affected lower limb and concomitant disarticulation of the innominate bone. The first procedure was performed by Kocher in 1884, and the second, by Billroth in 1890 *apud* Yancey et al.²; in both cases, the patients died. The first successful operation was performed in 1895 by Girard *apud* Pack and Miller³; only in 1916 was the procedure described by Pringle *apud* Banks and Coleman.⁴

Currently, hemipelvectomy procedures are divided into external (amputation) and internal (limb preserving surgery); the latter is subdivided according to the modified⁵ Enneking and Dunham⁶ classification as: Type I, iliac resection; Type II, acetabular resection; Type III, resection of the ischiopubic ramus; Type IV, resection of the sacroiliac joint; and H, if resection of the femoral head occurs (Fig. 1).

External hemipelvectomy often allows adequate margins, but it is associated with considerable morbidity and impaired limb function. Internal hemipelvectomy is an appropriate option when oncological margins can be obtained; however, the long-term function and survival are still not completely established in the literature.⁷

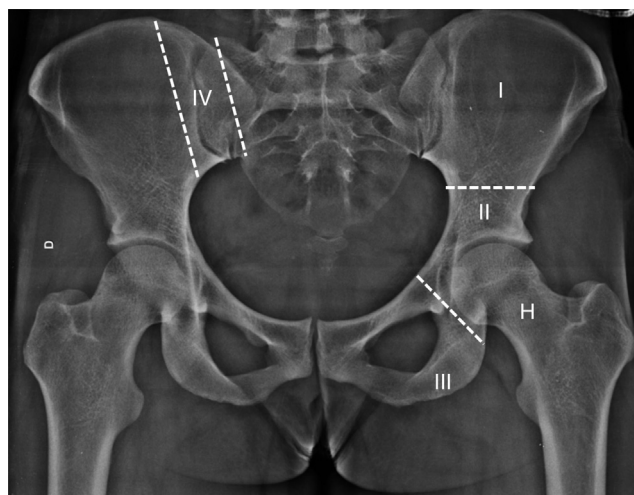


Fig. 1 – Internal hemipelvectomy. Type I, iliac resection; Type II, acetabular resection; Type III, resection of the ischiopubic ramus; Type IV, resection of the sacroiliac joint; suffix H, if there is resection of the femoral head.

A large number of musculoskeletal tumors (different diagnoses) can affect the pelvis. Several studies have reported bone sarcomas as the most common lesions, followed by soft tissue sarcomas and metastatic lesions.⁸ The most frequently observed pelvic sarcoma is of cartilaginous origin (chondrosarcoma), followed by osteosarcoma.⁹⁻¹¹

The most common location of pelvic lesions is the type with involvement of only one region, mainly the iliac, followed by the region of the ischial and iliopubic ramus and the acetabulum.⁹

In these patients, postoperative complications are not uncommon. Large dissections can compromise the viability of the muscle flaps and a large dead space is often present, which leads to the formation of collections, and consequently surgical site infection.^{9,12}

This study is aimed at analyzing the epidemiological profile of patients who underwent hemipelvectomy surgery and to compare the data with the literature.

Methods

This study was approved by the Ethics Committee, under opinion No. 563.674.

The study retrospectively evaluated 69 patients from the database of the Group of Bone Tumors of a teaching institution in São Paulo that underwent hemipelvectomy from January 1990 to December 2013. All patients had a previous diagnosis of primary or metastatic bone tumor in the pelvis (ilium, ischium, pubis, and/or sacrum). Patients who underwent hemipelvectomies for any other reasons were not included in the study.

The data was tabulated in an Excel[®] (Microsoft) spreadsheet.

Results

This study analyzed 69 charts of patients with pelvic neoplasm surgically treated by hemipelvectomy; of these, 47 were males (68%) and 22 females (32%). The mean age was 25 years (range: 4-98); the mean age of male patients was 23, and the female, 30. The most frequent etiologic diagnosis was osteosarcoma (35%), followed by Ewing's sarcoma (24.5%), chondrosarcoma (16%), other types of sarcomas (13%), giant cell tumor (7%), and metastatic carcinomas (4.5%). The mean age of patients with osteosarcoma was 16 years; with Ewing's sarcoma, 19; and with chondrosarcoma, 39. Among the patients, 20 had metastases (65% pulmonary), whether at diagnosis or during treatment.

The involvement of a single pelvic zone was observed in 26 cases (37.5%). Pelvic zone I was the most affected region, in 58 (84%) of 69 cases. In isolation, as the only affected area, it was also the most common region, representing 22 cases (32%, or 84.5% of the lesions in a single pelvic zone). Zone II had exclusive involvement in one case, zone III, in three cases, and zone IV was not affected alone. In cases with involvement of more than one pelvic area, the combination of zones I-II-III was the most common, with 12 cases (17.5%), followed by zones I-II, with 11 cases; zones I-II-III H, with six cases; zones I-IV, with four cases; zones II-III and I-II-III-IV, with three cases; and finally, zones II H and II-III H, with two cases.

In all cases of osteosarcoma, zone I was affected; the combination of zones I-II-III was the most common, being observed in seven (29%) cases, followed by exclusive involvement of zone I and of zones I-II, in six (25%) cases each. Regarding chondrosarcoma, zone I was the most affected region (65% of the cases); in cases of exclusive involvement, it was also the most common region (27% of cases) to present bone lesion. In patients with Ewing's sarcoma, zone I was the most affected (89% of cases); in cases of exclusive involvement, it was also the most common (40%), followed by zone I-II (30%). In patients with giant cell tumors, zone II was the most affected region (80% of the cases); in cases of exclusive involvement, this region was also the most affected (40%).

As surgical treatment, 55 (80%) hemipelvectomy procedures were performed with limb preservation (internal) and 14 procedures with limb amputation (external); of these, six procedures (43%) were due to osteosarcoma, one (7%) due to Ewing's sarcoma, three (21.5%) due to chondrosarcoma, one (7%) due to giant cell tumor, and three (21.5%) due to other lesions. Of the 55 patients treated with limb preservation, ten (18%) underwent concomitant pelvic reconstruction, four patients received personalized pelvic and hip prostheses, three underwent reconstructions with revision components of total hip arthroplasty, and in three, bone grafts and plate fixation were used.

In the postoperative follow-up, the most common complication was seroma formation or even prolonged local drainage in almost all patients. Eight cases (11.5%) presented infection. No cases of severe complications regarding the surgical flap were observed, only minor dehiscence and necrosis in the region of the surgical wound.

Local recurrence was observed in 19 cases (27.5%). A total of 13 (19%) patients died, and of these seven (54%) were diagnosed with osteosarcoma.

Discussion

As in international literature, a prevalence of about 2:1 men to women who required hemipelvectomy-type surgeries was observed in the present study.^{11,12}

Regarding the diagnoses, the authors agree with the literature finding that the most common lesions are primary bone sarcomas^{6,8,11-14}; however, among these lesions, the proportion observed in the present study is in marked disagreement. In the present study, osteosarcoma was predominant, followed by Ewing's sarcoma and by chondrosarcoma. The series of cases described in the literature indicate osteosarcoma as the main lesion,¹⁴ Ewing's sarcoma as the main lesion,¹¹ or chondrosarcoma as the main lesion.^{12,13} This difference is probably due to the fact that these studies present a number of patients that varied extensively, and some present arbitrary divisions in age groups for better evaluation of the population being assessed. Observing the larger series,^{12,13} it can be presumed that chondrosarcoma must have been the most common pelvic lesion treated by hemipelvectomy.

Regarding benign lesions, the present data are similar to those in the literature, placing giant cell tumor as the most common lesion.^{8,9,12}

In the literature, the involvement of more than one pelvic zone is the most common event, as observed in the present study^{5,12,14}; only one study reported more patients with single lesions.¹³ The most commonly affected pelvic region was zone I,^{5,8,9,12,14} but the exclusive involvement evaluation of this region is not evident in some studies due to the classification used (classic or modified⁵ Enneking and Dunham⁶; Fig. 1). Therefore, lesions that exclusively affect the iliac and those that extend to the sacrum are often classified together^{9,14}; in studies in which these two types of lesions were distinguished, isolated involvement of zone I was the most common.^{5,9,11,12} In the present study, this was the most frequent type of lesion, different from, for example, the series from the University of Bologna¹² with 270 patients, in whom the most common

type of lesion was the combination of zones II–III, rather than one single region. When analyzing the combinations, in the present study the most common type was the involvement of zones I–II–III. Similar results have been described in the literature,^{5,14} which also features different results, such as zones I–IV¹¹ and zones II–III.¹²

Regarding the diagnoses and locations of pelvic lesions, few studies have made this type of comparison; as they present a greater number of patients, in general, these studies report separate series for osteosarcoma, Ewing's sarcoma, and chondrosarcoma. In the present study, all patients with osteosarcoma presented some type of lesion that affected zone I, but the most common type was the combination of zones I–II–III; the literature indicates that the involvement of zone I¹⁵ is the most common, but the most recurrent type of lesion is the combination of zone I–II–IV,¹⁵ with the majority of patients treated by internal hemipelvectomy.¹⁶ This result was also observed in the present study (75% of cases). Regarding Ewing's sarcoma, the most affected region was zone I,¹⁷ which was also the most common type of lesion,¹⁷ similar to the present results. In patients with diagnosis of chondrosarcoma, the most affected region was zone I,^{18,19} which was also the most common type of lesion^{18,19}; these results were also observed in the present study, and the most common type of treatment was hemipelvectomy^{18,19} (73% of the present cases).

In cases where patients underwent internal hemipelvectomy, pelvic reconstruction was not performed in most cases^{8,14} (88.5% of the present cases); only one study presented a larger number of patients who underwent reconstruction.¹²

Regarding postoperative complications, the most common was infection in the present study, as in others^{13,20–22}; the highest incidence was in patients who underwent some type of reconstruction¹² (25% of the present cases). In turn, the literature presents several types of complications; each study specifies its most observed complication, such as deep venous thrombosis,⁸ dehiscence,⁸ and necrosis.^{20,21}

Local recurrence after hemipelvectomy was not a relatively uncommon event in this type of patient^{12,15,17–19}; a higher rate of recurrence was observed in patients with a diagnosis of chondrosarcoma¹² (31.5% of the present cases), followed by osteosarcoma^{12,19} (42% of the present cases).

Regarding survival rate, the comparison with the literature is hindered due to the small number of cases available for analysis in the present study; however, it was observed that the initial morbidity was relatively low⁸ and the survival rates were quite irregular. Several factors influence the prognosis, such as diagnosis, histological grade (when relevant), presence of metastases, and surgical margins, among others.^{12–14}

Conclusion

When analyzing the data obtained in the present study, it was observed that it is rather similar to data retrieved from world literature. The main diagnoses are malignant primary bone neoplasias; lesions in general affect the pelvic zone I (iliac bone) and the most frequent complication is infection. The differences found were mainly due to the rarity of the bone tumors evaluated in this study and to the type of surgical procedure in question, which are even more unusual.

Therefore, the rarity of these cases is the greatest obstacle to build a panorama that conveys the reality of each diagnosis and what characteristics of a patient would allow for relative or absolute indications for hemipelvectomy.

Conflicts of interest

The authors declare no conflicts of interest.

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