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Incisional hernia of the urinary bladder following internal hemipelvectomy

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ABSTRACT

INTRODUCTION: Hemipelvectomy are uncommon operations, usually performed for primary or metastatic malignant disease and less frequently for benign-aggressive tumours. There are very few reports in literature regarding complications of these procedures and even fewer reports about post hemipelvectomy hernias in particular.

PRESENTATION OF CASE: We present the only reported case of an incisional hernia of the urinary bladder following internal hemipelvectomy for aneurysmal bone cyst of the pubic bone. A careful literature review is also performed.

DISCUSSION: The development of the incisional hernia in the case of our patient can most likely be explained by the absence of advanced malignant disease of the pelvis that not only reduces the life expectancy but also overshadows other complications post hemipelvectomy. Furthermore, her young age and level of fitness allowed for a full postoperative rehabilitation which, combined with the proven anatomical changes of the internal organs following hemipelvectomies and the weakening of the tissues around the operative site, predisposed to the hernia formation.

CONCLUSION: Hemipelvectomy are extensive, anatomically disruptive operations, with significant detriment to the psychosomatic well being of the patients. We presented the only reported case of incisional hernia of the urinary bladder following internal hemipelvectomy and our reconstructive method of choice. We believe that, in the case of our patient, if a mesh had been used to reconstruct the primary defect during the initial surgery, this complication could have been prevented.

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1. Introduction

Hemipelvectomy are major, destructive operations, usually reserved for the resection of primary or metastatic, malignant or benign-aggressive tumours of the pelvic girdle.\textsuperscript{1,2} Various types of hemipelvectomy have been described, but they can be broadly classified into external and internal.\textsuperscript{1-3,6}

External hemipelvectomy invariably result in hindquarter amputations and are classified as simple when the pelvis is divided at the symphysis pubis and sacroiliac joint, extended when the surgical margins extend beyond those of the simple hemipelvectomy to include partial resection of the contralateral pelvic ring with or without adjacent organs and modified when the resection is more conservative and involves removal of the periacetabular region with preservation of the ilium and pubis.\textsuperscript{2}

Internal hemipelvectomy involve variable resection of the innominate bone and allow for preservation of the lower extremity. They can be classified depending on the region of the resected innominate bone from posterior to anterior as type 1-resection of ilium (extended type 1 has been described as en-bloc resection of the ilium and sacral ala), type 2-resection of the periacetabular region and type 3-resection of the pubis.\textsuperscript{6}

While external hemipelvectomy invariably result in hindquarter amputations and are therefore associated with high functional and psychological morbidity,\textsuperscript{1} internal hemipelvectomy allow preservation of the limb and have become, in certain cases, a safe alternative that has been successfully used for the treatment of benign-aggressive tumours, primary sarcomas or metastatic disease.\textsuperscript{3-6}

Due to the fact that hemipelvectomy are uncommon operations performed for conditions with high mortality rates, the available literature examining their complications is scant. Postoperative hernia formations, in particular, appear to be documented very scarcely in literature and even then, they are usually associated with external, rather than internal, hemipelvectomies.\textsuperscript{2-5}

We present a case of a female patient, who developed a postoperative incisional hernia of the urinary bladder following internal hemipelvectomy for an aneurysmal bone cyst. To our knowledge, this is the only reported case of bladder hernia following such a procedure. The uniqueness of this complication prompted this case report.
2. Presentation of case

Our patient was a 26-year-old female, who presented to our unit with a 1-year history of a symptomatic incisional hernia of the left inguinal region. Eight years previously, she had undergone internal hemipelvectomy for a 6 cm aneurysmal bone cyst, affecting her left pubic bone and symphysis pubis. At the time, a type 3 internal hemipelvectomy was performed, during which the cyst was resected along with the superior part of the pubic bone and part of the pubic symphysis. The access incision was placed in the left inguinal region. Resection margins were proven to be histologically clear of disease.

As part of our diagnostic approach, plain X-rays and CT imaging of the pelvis were performed (Figs. 1 and 2) which revealed the presence of an incisional bladder hernia. Subsequently, the patient underwent surgery, during which the hernia was successfully reduced and the defect repaired with a polypropylene mesh, secured circumferentially on the rectus sheath, remnants of symphysis pubis, fascia lata, femoral sheath and pre-existing scar tissue (Fig. 3). Recovery and post-operative course of the patient were uneventful.

3. Discussion

Hemipelvectomy, both external and internal, are major procedures with many intra- and post-operative complications. Furthermore, they are uncommon operations and existing literature seems to focus more on their indications, operative variations or functional and psychological outcomes than on their complications.2 Incisional hernias, in particular, have rarely been reported, which is surprising since both the change in visceral anatomy and the weakness of the tissues at the operative site would predispose to hernia formation. In particular herniation of the urinary bladder secondary to internal hemipelvectomy, such as the one we present in this paper, has never before been reported.

In a publication in 1992, Kraybill et al. presented a series of four case reports of incisional hernias following external hemipelvectomy;2 two of these involved the bladder. They also examined the incidence of symptomatic incisional hernias in a series of 30 patients who underwent hemipelvectomy over a period of 50 years and reported it to be as high as 6% (2 out of 30 patients). In an editorial comment to this publication, Karakousis reiterated the development of incisional hernia as a complication from the procedure, and stated that in his series, the incidence was 20% (3 out of 15 patients). Karakousis did not mention the contents of the hernia sac in his cases. Both authors suggested that incisional hernias tended to be underreported, as they were often asymptomatic or overshadowed by the more serious complications and the poor life expectancy associated with advanced malignancies of the pelvic girdle requiring hemipelvectomy.

In a later publication,3 Holbert and Lewis examined 25 patients who underwent hemipelvectomy, by utilising CT-imaging to evaluate normal and abnormal post-operative findings. Their results are very interesting as they reported post-operative anatomical changes of internal organs, including infrafemoral displacement of the bladder in both male and female patients. Despite this, they did not report herniation of the bladder in any of the patients; rather, the only case of hernia they reported was a lumbar hernia in a patient that had undergone internal hemipelvectomy.

Subsequent publications reporting post-hemipelvectomy hernias are very few and far between and mostly involve incisional hernias of the stump following external hemipelvectomy.4,5 In the case of our patient, a type 3 internal hemipelvectomy with resection of the pubic bone and symphysis pubis was performed for a 6-cm aneurysmal bone cyst, which is a benign, albeit aggressive, tumour. The patient was quite young at the time of the primary surgery (17 years old) and her incisional hernia did not become symptomatic until 8 years post-operatively. The hernia sac was shown by pre-operative CT – and confirmed intra-operatively – to contain part of the urinary bladder, which is a unique case.
in literature. This probably represents the fact that hemipelve-
tomies are uncommon procedures, usually performed in cases of 
malignancy, where the mortality rates are already high enough,1–3 
thus not allowing enough time for hernia formations. Furthermore, 
more serious complications tend to overshadow discomfort from 
cisional hernias and it is likely that if hernias do indeed occur, they 
remain subclinical, as the patients are often functionally limited to 
a great extent.1 Our patient was a fit and healthy teenager, who 
derwent internal hemipelvectomy for benign disease and was 
subsequently fully mobile. The absence of malignancy, combined 
with the proven inferolateral displacement of the bladder following 
the procedure3 and the weakness of the tissues around the inci-
sion, provided the necessary environment for the development of 
a symptomatic bladder hernia.

Although we cannot advocate a change in current techniques 
and approach to hemipelvectomies, we do feel that in the case of 
our patient, reinforcing the primary defect with a mesh during the 
initial operation could have prevented the hernia from developing.

4. Conclusion

Existing literature attests to the fact that hemipelvectomy, 
both external and internal, are extensive operations, frequently 
followed by significant detriment to the patients’ psychosomatic 
balance. We recently had to treat a healthy female patient who 
developed incisional hernia of her urinary bladder, following inter-
nal hemipelvectomy for aneurysmal bone cyst of the left pubic 
bone. This complication has never before been reported in liter-
ature, most likely due to the very poor prognosis and functional 
outcomes associated with hemipelvectomies. We believe the fac-
tors that contributed to the formation of the hernia in our patient 
were a combination of the benign nature of her disease, which 
allowed for full rehabilitation, with an anatomically disruptive 
operation; this created the conditions required for the develop-
ment of an incisional bladder hernia. We therefore believe that, in 
the case of our patient, the use of a mesh to repair the defect during 
the primary surgery could have prevented this complication.

Conflict of interest statement

No conflict of interest.

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Ethical approval

Written informed consent was obtained from the patient for 
publishation of this case report and accompanying images. A copy 
of the written consent is available for review by the Editor-in-Chief 
of this journal on request.

Author contributions

N. Arkouis: literature review, writing the paper. G. Savanis: 
idea of paper, supervision of task. G. Simatos: supervisory and 
supportive role. H. Zerinis: assistance with literature review 
and data collection. A. Nisiotis: assistance with editing of the 

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