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Anterior pelvic exenteration for exstrophic bladder adenocarcinoma: Case report and review



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ABSTRACT

INTRODUCTION: Bladder exstrophy is a very rare congenital anomaly and is associated with an increased incidence of bladder cancer. Most patients undergo reconstructive operations during childhood.

PRESENTATION OF CASE: A 53 year-old woman was diagnosed with enteric type mucinous adenocarcinoma of the unreconstructed exstrophic bladder. Preoperative examination revealed no primary site in the gastrointestinal system. The patient underwent an anterior pelvic exenteration with bilateral ureterostomy and repairing of the anterior abdominal wall defect with a mesh.

DISCUSSION: Carcinoma of the exstrophic bladder is a very rare entity. An overall number of 118 cases of cancer in unreconstructed bladder have been reported in the literature since 1895 with adenocarcinomas consisting of 90–91% and squamous cell carcinomas 8.5%. Mechanical irritation on the bladder mucosa, embryologic origin and urine carcinogens are some of the theories of cancerous metaplasia.

CONCLUSION: This is the first case of bladder exstrophy cancer reported that was submitted to anterior pelvic exenteration. We propose this surgical procedure as an appropriate alternative in postmenopausal women and cancer of the unreconstructed bladder exstrophy.

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1. Introduction

Exstrophy of the bladder is a very rare congenital anomaly associated with increased incidence of bladder cancer. It consists of a very troublesome defect for the patients who suffer from it. Many new surgical techniques have been developed lately and repairing of the exstrophy during childhood is the rule in the vast majority of cases. The quality of life of patients with exstrophy has been markedly improved permitting them to live a normal life. However due to several reasons, some patients remain with unreconstructed exstrophic bladder until adulthood. Here we present a rare case of a 53 year-old woman with a mucinous adenocarcinoma occurring in the unreconstructed exstrophic bladder.

2. Case report

A 53 year-old woman with bladder exstrophy was admitted to our department because of vaginal bleeding. Clinical evaluation revealed the presence of a round, polypoid, irregular, friable, ulcerated mass in the hypogastric region, which affected the clitoris

and the labia majora. The lesion was bleeding during palpation. Umbilicus was absent. Bilateral inguinal lymph nodes were not palpable. Routine laboratory investigations were within normal limits. Biopsies of the bladder mass revealed an intestinal type adenocarcinoma. According to immunohistochemistry control: CK 20(+), CDX2(+), CEA(-), CK 7(-), CK 34(-), BE 12(-), the most possible cause is considered the urachal remnants, while the endoscopic examination of upper and lower gastrointestinal tract was negative. Examination under anaesthesia was performed, where a polypoid mass of the anterior abdominal wall was recognized behind the pubic symphysis (Fig. 1). Its diameter was around 10 cm. Vagina and the external cervical opening were recognized, but not as well the external urethral meatus. A deficit of anterior wall muscles was tested. The left ureteral opening was seen, with clear urine output, but the right ureteral opening could not be identified. A biopsy of the mass was taken. Contrast-enhanced axial CT image through the abdomen and pelvis demonstrated a midline, infraumbilical soft-tissue mass of the anterior abdominal wall extending to the vulva along with anterior displacement of the anus and wide separation of the pubic symphysis. Pelvicalyceal systems and ureters were dilated. The ureters in their termination had an abnormal anterior course. There was no identifiable shape of urinary bladder. Absence of bladder filling was also noticed at the delayed scan (Fig. 2). Computed tomography of the thorax and mammography were normal.

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Fig. 1. Bladder exstrophy complicated by carcinoma. A round, polypoid, friable mass of 10 cm diameter, with concomitant rotation of the innominate bones and diastasis of pubic symphysis.



Fig. 2. Polypoid, enhancing, soft-tissue mass of the hypogastrium. External rotation of the innominate bones with concomitant diastasis of pubic symphysis and anterior position of the rectum.

Anterior pelvic exenteration was performed with en bloc removal of the exstrophic bladder, the uterus, the adnexa, the rudimentary patch of the vagina and the lower ureter thirds bilateral. A bilateral external ureterostomy also was occurred. Abdominal wall closure was a difficult procedure and the ifraumbilical deficit was closed by a mesh. In the bladder a low-grade (Gr1) mucous adenocarcinoma was seen, probably originating from the exstrophy of the urinary bladder. Our patient had an excellent post-operative outcome without inflammation of trauma, fever elevation or any renal disorder. The patient was released on the 12th postoperative day. The patient was not given any adjuvant therapy and is doing well at six months of follow up.

3. Discussion

Exstrophy of the urinary bladder is an uncommon congenital deformity with an incidence of about 2.07–2.15 cases in 100,000 live births [1]. The male to female ratio of bladder exstrophy derived from multiple series is 2.3:1. It is not familial, although the risk of recurrence in a family with Bladder Exstrophy and Epispadias complex is about 1 in 70 live births. Recent published evidence suggests that the risk of bladder exstrophy in children born as a result of assisted fertility techniques is eight times greater than in

children conceived naturally [2]. The malformation is defined as an incomplete fusion of the mesoderm, which forms the tubercle genitalia, anterior wall of the bladder and inferior portion of the anterior abdominal wall, due to the failure of mesenchymal cells to migrate between the ectoderm and endoderm of the abdominal wall. Diastasis of muscle recti and symphysis, eversion of the posterior bladder wall including the ureteral orifices in the anterior abdominal wall, separated scrotum/labia majora and divided penis/clitoris are some characteristics of bladder exstrophy.

Since the early 70s surgical intervention has been recommended in childhood in order to gain continence of urine, maintain patient's renal function, reconstruct the external genitalia and avoid the occurrence of carcinoma [3]. Because most of the patients with bladder exstrophy undergo reconstruction at a younger age, treatment of bladder exstrophy in adult patients is occasionally reported in the literature, and delayed presentation may be due to ignorance, lack of proper medical facilities or social embarrassment. The latter sometimes force patients to come up with ingenious devices in order to solve their problem and not to seek medical advice [4]. Nevertheless, carcinoma developing in bladder exstrophy still occurs and patients at the adulthood are at risk of developing malignant tumors, even after functional closing.

Adenocarcinoma of the urinary bladder is a rare malignant neoplasm and accounts for 1.6% of bladder cancers. However, it accounts for more than 90% of carcinomas of the exstrophic bladder. On 1895 we have the first of a case of carcinoma of the unreconstructed bladder exstrophy [5]. Nielsen and Nielsen [6], reviewed 81 cases since 1983 and until this present report a total of 118 cases including ours, have been reported. Squamous cell carcinoma stands for 10 out of 118 cases (8.5%) and adenocarcinomas are the majority of the remaining, which makes an incidence of 90–91% among patients with bladder exstrophy.

The malignant potential of the exstrophied bladder mucosa is well known. The incidence of carcinoma in exstrophy of the bladder varies among 4% and 7.5% in different reports. That makes the risk of malignancy in exstrophy of the bladder much higher than in the average population, where the risk of bladder carcinoma accounts for 20 in 100,000. In a large cohort of 103 patients born with exstrophy of the bladder the incidence of neoplasia after a minimum of 35 years of follow-up was 4%, which is 694 times greater incidence in the risk of bladder cancer than in the normal population. Cystectomy does not prevent the malignancy occurrence and all cancers developed in men, a fact that according to the authors may possibly be due to male anatomy that does not permit as extended cystectomy as in the female [7].

On the other hand there is a high risk of colorectal neoplasia as a consequence of reconstructive surgery which permits the urinary and fecal streams to mix in a common reservoir (ureterosigmoidostomy, vesicocolic anastomosis). Patients who have been submitted to this kind of operations were found to have a 1726-fold greater incidence of adenocarcinoma of the colon. Annual colonoscopy of patients deemed at high risk of colorectal neoplasia appears to be an effective screen for colorectal carcinoma, by identifying a pre-malignant stage [7].

The cause of the carcinogenesis in exstrophic bladder is unknown yet, although there are different theories for the explanation of the higher risk and the histology of the tumors. The epithelium of the exstrophic bladder shows glandular metaplasia in the middle of the bladder and squamous at the top of the trigone merging into normal skin [8]. Squamous metaplasia was a finding in the pathology specimen of our case also. Corica et al. followed up 29 children with bladder exstrophy and intestinal metaplasia of the bladder and after a median range of 13 (3–23.9) years patients had no evidence of bladder cancer. This led the authors to conclude that intestinal metaplasia is not a risk factor for adenocarcinoma of the exstrophic bladder [9].

Mechanical irritation on the bladder mucosa has been hypothesized to be the stimulus of the metaplastic process, leading later to carcinogenesis. As early as 1921 Lower believed that the irritation from the metal collector his patient invented caused the carcinoma.¹³ This theory is further supported by the fact that most patients develop carcinoma in their forties or fifties and chronic inflammatory symptoms of the mucosa are visible histologically in bladder sections not invaded by the tumor. Exposure of the exstrophic bladder to the environment and constant infection results in glandular metaplasia, possibly to produce protective mucus and this may be the origin of the malignant change.

Another hypothesis is the influence of carcinogenic substances from the urine on the mucosa [10]. There are multiple reports of patients who had colon adenocarcinoma after ureterosigmoidostomy. Therefore development of colon cancer adenocarcinoma at the ureterosigmoidostomy site is well established, and the risk is 100–550 times greater than general population and 7000 greater among than people <25 years old.

The last theory is the embryological origin of these tumors especially adenocarcinomas of the colonic type in bladder exstrophy like the one in our case. This is probably due to an originally rectal epithelium misplaced during the division of the cloaca. However development of carcinomas mostly in the 5th of 6th decade is against the usual behavior of tumors of embryological origin. In an interesting report Eastman et al., found that von Brunn's nests are especially prevalent in the exstrophic bladder, a birth defect that predisposes the patient to formation of bladder cancer. They discovered also that the exstrophic condition appears to have hijacked the FGF-10 signal transduction system to serve as the principle mitogenic mechanism which underlies the proliferation and development of von Brunn's nests in the exstrophic bladder [11].

Anterior pelvic exenteration with bilateral ureterostomy is the operation we chose to proceed with in our case. Pelvic exenteration refers to an ultraradical surgical procedure consisting of an en bloc resection of the female reproductive organs, lower urinary tract, and a portion of the rectosigmoid. In an anterior pelvic exenteration the rectum is spared and is suitable for lesions confined to the cervix and the anterior upper vagina. The goal is to remove the bladder, the urethra and anterior vagina but save posterior vagina and rectum. It may be offered to women with recurrent or advanced gynecological cancer with extensive central pelvic disease that cannot be resected with a lesser procedure and in whom radiation is not an option [12]. This operation is usually undertaken by laparotomy by robotic anterior exenteration is another option with favorable operative, pathologic and short term clinical outcome. Furthermore, the same results have been reported in robot assisted laparoscopic anterior pelvic exenteration for bladder cancer.

4. Conclusion

To the best of our knowledge this is one of the few cases of cancer in exstrophic bladder reported in the literature that was treated in a gynecology department, and the first case that an anterior pelvic exenteration has been chosen as the proper surgical operation. The results were excellent. Postoperative condition of the patient was remarkable with no early or late complications. For that reason we advocate anterior pelvic exenteration to be an alternative option to radical cystectomy for the treatment of postmenopausal women with cancer of bladder exstrophy.

Conflicts of interest

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Ethical approval

Authors have patients signed informed consent.

Consent

Authors have patients signed informed consent.

Author contribution

N.K writing the paper.
N.T performed the operation.
I.M literature search.
I.P data collection.
S.N study concept, critical revision of the article.
A.R study supervision, performed the operation.

Guarantor

Kathopoulos Nikolaos is guarantor.

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