

# Mullerian remnants presenting as a pelvic cyst in a young adult with 45X0/46XY mixed gonadal dysgenesis

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## Abstract

A 22-year-old known case of 45X0/46XY mixed gonadal dysgenesis, reared as a male, presented with complaints of suprapubic and left iliac fossa pain for the past 1 month. The patient underwent laparoscopic right orchidectomy (streak) + Mullerian remnant excision + left orchidopexy + first-stage hypospadias repair 10 years back. Contrast-enhanced computed tomography showed a large complex cyst in the left side of the pelvis and rectovesical space. Excision of the cystic structure was done along with left orchidectomy. Histopathological examination revealed features of Mullerian remnants (endometrial glands and cervix) in the cystic structure. The importance of this case report is to emphasize the fact that the Mullerian remnants tend to enlarge in size over time and become symptomatic and may require a surgical removal at a later date as in our case.

**Keywords:** 45X0/46XY mixed gonadal dysgenesis, mixed gonadal dysgenesis, Mullerian remnants

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## INTRODUCTION

In 1963, Sohval coined the term mixed gonadal dysgenesis (MGD).<sup>[1]</sup> It is a disorder of sexual development (DSD). MGD is the second most common cause of ambiguous genitalia at birth. In MGD, there is a numerical sex chromosome abnormality due to Y chromosome mosaicism leading to abnormal gonadal development which includes various degrees of phallic development, urogenital sinus with labioscrotal fusion, and cryptorchidism. The phenotypic spectrum varies widely from a phenotypic female with Turner's syndrome to ambiguous genitalia to a normal male.<sup>[2]</sup> Here, we report a case of MGD with retained Mullerian structures presenting as a symptomatic pelvic cyst, which was removed surgically.

## CASE REPORT

A 22-year-old known case of 45X0/46XY MGD, reared as a male, presented with complaints of increasing, dull-aching, intermittent suprapubic, and left iliac fossa pain for the past 1 month. The patient underwent laparoscopic right orchidectomy (streak gonad) + Mullerian remnant excision + left orchidopexy + first-stage hypospadias repair 10 years back. The old histopathological report of excised specimen showed features of streak gonad and fallopian tube. The patient was on regular intramuscular depot injections of testosterone at a local center. As the patient was from a poor socioeconomic status, he did not turn up for second-stage hypospadias repair. The patient was moderately built and nourished. Vitals were stable. Facial, axillary, chest, and pubic hairs were

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present but scanty. External genitalia revealed penoscrotal hypospadias and absent testis on the right side of the scrotum [Figure 1]. His urine routine showed 15–20 pus cells/HPF. Urine culture and sensitivity showed positivity for *Escherichia coli*. Blood investigations revealed blood sugar (random) – 108 mg/dl, blood urea nitrogen – 18 mg/dl, serum creatinine – 0.8 mg/dl, serum electrolytes within normal limits, serum testosterone – 242 ng/dl, luteinizing hormone – 9.4 mIU/ml, and follicle-stimulating hormone – 7.0 mIU/ml. Contrast-enhanced computed tomography showed complex cysts in the pelvis and rectovesical space of size 12.5 cm × 7.5 cm × 6.5 cm and 12 cm × 6 cm × 5.5 cm, respectively, and both the kidneys appeared normal [Figure 2]. As the patient had previous laparoscopic surgery and also since the cysts were large and complex, a laparotomy was preferred. The patient underwent laparotomy with excision of cystic structure under spinal anesthesia. Intraoperatively, there was a single large cyst in the rectovesical space which has folded on itself and entering the left side of the pelvis which was densely adherent to bladder. Furthermore, the left spermatic cord was adherent to the cystic structure, and hence, the left testis has to be sacrificed along with excision of the cystic structure [Figure 3]. Postoperatively, the patient recovered well. Histopathological examination revealed features of Mullerian remnants (endometrial glands and cervix) in the cystic structure removed [Figure 4]. The patient is currently on hormonal therapy (testosterone) and is planned for hypospadias repair and testicular implantation at a later date.

## DISCUSSION

MGD is one of the multiple variants of sex chromosome mosaicism. Mosaicism is the state of being composed of

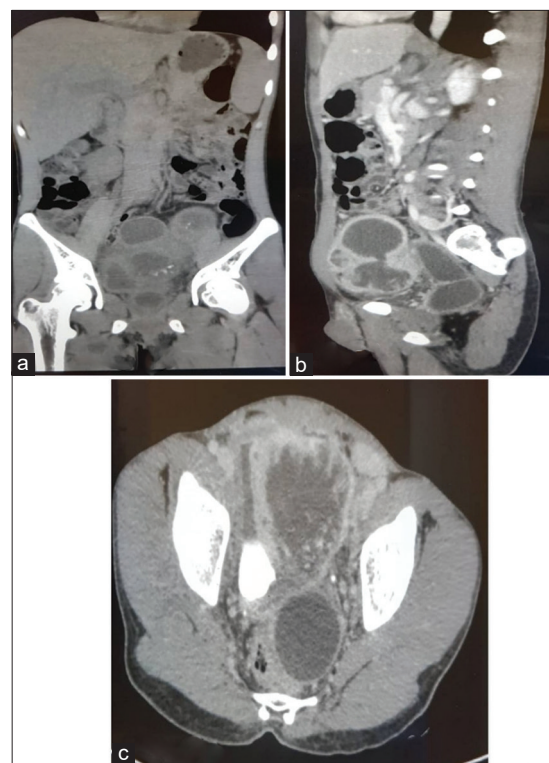


**Figure 1:** External genitalia showing empty right hemiscrotum with meatal opening at penoscrotal junction (arrow mark pointing the urinary meatus)

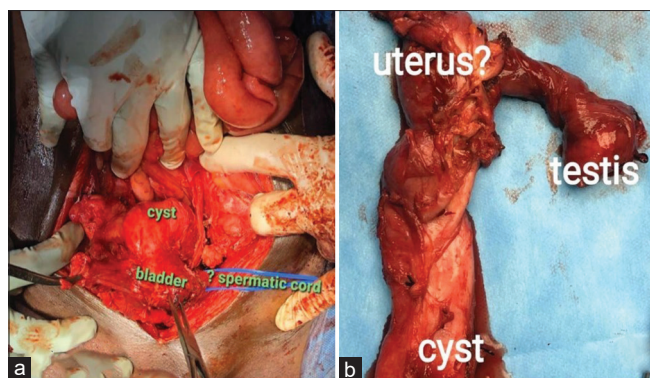
cells of two or more genetically different types and is thought to occur via chromosomal misaggregation secondary to anaphase lag or chromosomal rearrangement during early embryonic mitosis.<sup>[3]</sup> Most patients have a 45XO/46XY karyotype with a palpable gonad (testis – usually dysgenetic) on one side and a contralateral intra-abdominal streak gonad.<sup>[4]</sup> In a study by Robboy *et al.*, 95% of MGD patients had Mullerian remnants and 75% of streak gonads had an ipsilateral fallopian tube.<sup>[5]</sup> These abnormalities are a result of incomplete inhibition of Mullerian structures, incomplete mesonephric duct structure differentiation, and incomplete masculinization of the external genitalia.

Management is multidisciplinary and heterogeneous across centers. Management involves sex assignment, which is more complex in these patients, especially in those with genital ambiguity at birth. It is important not to assign a sex immediately and delay it till full evaluation.

Surgical management in children assigned a male sex includes cystoscopy with genitoscopy to outline the urogenital sinus, removal of streak gonad, contralateral orchidopexy, screening for renal malignancies (Wilms' tumor),<sup>[6]</sup> hypospadias correction by urethroplasty, and assisted hormonal therapy in the form of testosterone injection.



**Figure 2:** (a-c) Contrast-enhanced computed tomography abdomen and pelvis showing large complex cyst in the left side of the pelvis and rectovesical space

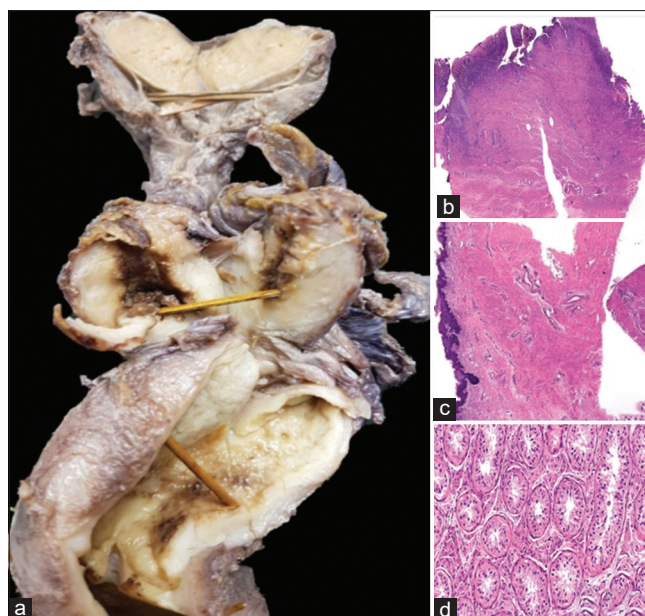


**Figure 3:** (a) Intraoperative picture showing dense adhesion between cyst, bladder, and left spermatic cord. (b) Resected specimen (cystic structure resembling uterus, cervix with cord structure, and left testis)

MGD patients harboring Y-chromosome material are thought to have a significant risk of malignancy.<sup>[7,8]</sup> Germ cell tumors can occur both in the streak gonads and in the dysgenetic testes of individuals with 45XO/46XY mosaicism.<sup>[9]</sup> The intra-abdominal streak gonad should be removed considering the significant gonadal tumor (gonadoblastoma and dysgerminoma) risks and the lack of function<sup>[10,11]</sup> as a laparoscopic procedure, along with assessment of Mullerian remnants and orchidopexy of the contralateral undescended gonad. The contralateral gonad (testis) needs a careful follow-up as it is dysplastic and presents with high tumor risks.<sup>[10,12]</sup> Some centers advocate biopsy of the scrotal gonad to look for dysplasia at puberty.

The cavitation and separation process of the urological and genital tracts fails in most DSD situations resulting in a retrourethral Mullerian cavity/remnant. Mullerian remnants are asymptomatic in most cases.<sup>[13]</sup> There is some consensus that persistent Mullerian structures do not require early surgery and may be kept as long as no symptoms (dysuria, infections, cyclical pain, and calculi) are related to them.<sup>[14]</sup> Removing these structures has its own morbidity with a high risk of damaging the genital ducts in individuals who already have a very low fertility potential.

Surgical removal of symptomatic Mullerian remnants poses certain difficulties which include dense adhesion of remnants with the bladder and the spermatic cord structures. The vascular anatomy of the vas deferens is complex and closely relates to the uterus and fallopian tubes. Removal of the Mullerian structures poses a risk to the viability of the testis and may damage the vas deferens.<sup>[15]</sup> Microvascular autotransplantation of the testis after complete excision of the Mullerian structures has been described but may not be always feasible.<sup>[16]</sup>



**Figure 4:** (a) Excised gross specimen. (b) Histopathology showing poorly formed areas of endometrial glands and stroma. (c) Histopathology showing foci of the cervix. (d) Histopathology showing seminiferous tubules with spermatocytes and spermatogonia

Since the Mullerian remnants became symptomatic in our case and also cancers of the Mullerian remnants have been reported,<sup>[17]</sup> we went ahead with surgical removal. Intraoperatively, the left spermatic cord was densely adherent to the remnants, and also considering the risk of dysgenesis in the retained testis in MGD patients, a left orchidectomy was done.

## CONCLUSION

There is only a low level of evidence available regarding the management of Mullerian remnants in MGD in literature and is managed in the same way as Mullerian remnants in persistent Mullerian duct syndrome. Surgical removal is the mainstay of treatment for symptomatic Mullerian remnants. It is known that the Mullerian remnants can cause tethering and difficulties in mobilizing the spermatic cord, and at times, it is impossible to remove the Mullerian remnants alone without sacrificing the vas deferens and hence the testis. There is an intrinsic tendency for Mullerian remnants to manifest into cancers, and also, the higher tumor risk in the contralateral dysgenetic gonad in MGD should also be kept in mind.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in



the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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