Persistent Mullerian duct syndrome: A case report and review of the literature

Temitope O. Odi, Lukman O. Abdur-Rahman, Abdulrasheed A. Nasir

ABSTRACT

Persistent Mullerian duct syndrome is a rare form of internal male pseudohermaphroditism, in which Mullerian duct derivatives (uterus and fallopian tubes) are present in a genotypic (46XY) and phenotypic male. Over 150 cases have been reported, mainly from outside the African setting. This article presents an unexpected case encountered in an African setting. Handicaps in the management were unavailability of necessary diagnostic tools as well as lack of finance to assess those available. Although a diagnosis was eventually arrived at and the parents thoroughly counseled, the patient has not represented for definitive surgery.

Key words: Anti-Mullerian hormone, male pseudohermaphrodite, persistent Mullerian duct syndrome

DOI: 10.4103/0189-6725.70425

INTRODUCTION

Persistent Mullerian duct syndrome (PMDS) is a rare form of internal male pseudohermaphroditism, in which Mullerian duct derivatives (uterus and fallopian tubes) are present in a genotypic (46XY) and phenotypic male.[1] The syndrome is caused by absence of anti-Mullerian hormone or defective functioning of anti-Mullerian hormone type II receptors.[2] It is familial, probably with a sex-linked autosomal recessive or X-linked recessive inheritance.[3] Over 150 cases of PMDS have been reported in the literature, mostly in adults,[1,4] and mainly from Western, European and Middle Eastern Settings. This article presents a case in an African setting highlighting the challenges of management.

CASE REPORT

A 5-year-old boy was referred to us on account of an unexpected intra-operative finding of ovaries, fallopian tubes and uterus in a right inguinoscrotal hernia sac during a herniotomy operation. He had been diagnosed with a right inguinoscrotal hernia and left undescended testis. The structures were returned to the peritoneum and the peritoneal sac was closed.

His referral letter included a clinical photograph of the described intra-operative findings [Figures 1 and 2].

Our review revealed no history of ambiguous genitalia or early infant death among siblings in the family and his parents were unrelated.

Examination showed a healthy looking child dressed as a boy. He had a healed right inguinal herniotomy scar. His phallus was circumcised and adequate for his age and the scrotum had ruggae, but both hemiscrotums were empty.

An abdominal ultrasound scan did not identify either the said female internal genitalia or the testes. His buccal smear was suggestive of XY sex chromosomes. Testosterone assay was normal (0.2 ng/ml). Retrograde urethrogram showed a single tract leading to the urinary bladder [Figure 3].

The parents were counseled on the suspected pathology of PMDS, the failure of ultrasound scan to identify the said internal organs and the need for a definitive diagnosis. A mini laparatomy to explore the internal organs was performed.

Intra-operative findings were a uterus with fallopian tubes whose fimbrial ends contained gonads. The antimesenteric border of the gonad had cystic structure, suggestive of an ovotestis. The vas deference could not be distinctively identified. Gonadal biopsy was performed bilaterally.

The parents have failed to present the child for further management over 24 months later despite repeated phone calls to them. His biopsy result revealed atrophic testicular tissue bilaterally.

Department of Surgery, University of Ilorin Teaching Hospital, Ilorin, Nigeria

Address for correspondence:
Dr. Temitope O. Odi,
P.O. Box 272, Ilorin Nigeria.
E-mail: oditemi@yahoo.com



Figure 1: Intraoperative findings of uterus, fallopian tubes and ovaries in the right inguinal hernia



Figure 2: Another view of Right inguinal hernia containing uterus, fallopian tubes and ovaries



Figure 3: Retrograde urethrogram showed a single tract leading to the urinary bladder

DISCUSSION

PMDS is a rare form of internal male pseudohermaphroditism, in which uterus and fallopian tubes are present in a normal male, karyotype 46XY. Normal male sexual differentiation is dependent on at least two factors: testosterone and Mullerian inhibitory factor (MIF) produced by the testis, the latter being responsible for the regression of the Mullerian structures in the male foetus. In the absence of MIF, therefore, the Mullerian duct differentiates into the fallopian tube, uterus and upper vagina.[5] The proposed aetiologies for PMDS are deficiency of MIF, abnormality in its receptor or failure to produce MIF before the 8th foetal week.[2,5] The mode of transmission is considered genetically heterogeneous and the presence of consanguinity in some cases and the occurrence of PMDS in several pairs of brothers suggest autosomal recessive male-restricted transmission.[6]

Without a high index of suspicion, PMDS is usually an unexpected finding at surgery[1,7-9] This was the case in this patient. There are two anatomic types or forms, classified as "male" or "female".[2] The male form, also called hernia uteri inguinal, is more commonly encountered. Here, one testis is usually normally descended in the scrotal sac. The uterus and ipsilateral fallopian tube and, sometimes, the contralateral testis and tubes are either in the inguinal canal or can be brought into the inguinal canal by gentle traction on the presenting testis.[7] The less-common female form is characterized by bilateral cryptorchidism, with the testes embedded in the broad ligament in an "ovarian" position with respect to the uterus, which is fixed to the pelvis. The vas deferens are usually found to be intimately adherent to the lateral walls of the uterus and course along the cervix in these two anatomic forms of PMDS.[7] PMDS has been reported in association with transverse testicular ectopia, a rare anomaly in which the testis is seen in the contralateral inguinal canal or in the hemiscrotum.[9] This was first described in 1895 by Jordan.[10] Also reported is the association with testicular tumours, although the incidence of malignant transformation in these patients is similar to the rate in abdominal testes in otherwise normal men.[10] Virilisation generally remains unaffected, but infertility is common because most patients have azoospermia.[9,10]

Diagnosing PMDS is based on a combination of anatomic and clinical findings. Imaging features, although classic, are often missed.[1,2,7,9] Ultrasound scan failed to identify the internal structures in our patient too. However, when availability and affordability are not an issue, computed tomography (CT) and magnetic resonance imaging (MRI) are known to show the tubular structures clearly.[6,9] Ideally, this diagnosis should be complemented by karyotyping, for which we lacked the requisite facility. We could only perform buccal

smear for chromatin. Similarly, a CT or MRI scan could have been performed to visualise the internal organs, but the parents were financially handicapped. Laparoscopy would have equally been preferred to the minilaparatomy that we performed, but we lacked the requisite equipment.

The surgical management of PMDS is still controversial.[1,7] A staged procedure is the most viable option. The first stage should be testicular biopsies, replacement of the testis, uterus and fallopian tubes in the pelvis and repair of the hernia.[1,8] These were all performed on our patient by the referring doctor, except for the testicular biopsies. The biopsy is necessary because there usually is a well-reported[1,9] cystic structure at the antimesenteric side of the testis, making it necessary to differentiate PMDS from an ovotestis. We found this in our patient, necessitating a biopsy at the minilaparatomy rather than the definitive procedure.

After PMDS is confirmed by the karyotype (46XY) and testicular histology, the definitive operation is then performed. If the testes are normal, Guerrier *et al*. advocate bilateral proximal salpingectomies, leaving fimbriae with the epididymes, corporal hysterectomy and bilateral orchidopexy.[2] David *et al*. however found no absolute indication for the removal of the Mullerian duct structures, other than where they limit testicular mobility during orchidopexy, because no malignant degeneration of the retained Mullerian structures in PMDS has ever been documented.[9,10] If the testes are atrophic or cannot be brought down in orchidopexy, then orchidectomy alone should be performed.[1] The risk of testicular malignancy is similar in PMDS and cryptorchidism, at 5–18%.[1,10]

Our patient has however failed to represent for the definitive stage of his management.

In conclusion, PMDS is a rare form of male pseudohermaphroditism often encountered unexpectedly at surgery for cryptorchidism or inguinal hernia. Diagnosis is enhanced by a high index of suspicion, imaging and karyotyping. Genetic counseling should be offered to parents of affected patients and long-term follow-up is necessary.

REFERENCES

1. Crankson SJ, Bin Yahib S. Persistent Mullerian duct syndrome in a child: Surgical management. Ann Saudi Med 2000;20:3-4.
2. Guerrier D, Tran D, Vanderwiden JM. The persistent Mullerian duct syndrome: A molecular approach. J clin endocrinol metab 1989;68:48-52.
3. Sloan WR, Walsh PC. Familial persistent Müllerian duct syndrome. J Urol 1978;115:459-61.
4. Kshirsagar AY, Dombale VD, Zaware SU. Pseudohermaphrodite presented as an irreducible inguinal hernia. J Indian Med Assoc 2007;105:528-30.
5. Josso N. Paediatric applications of anti-müllerian hormone research. 1992 Andrea Prader Lecture. Horm Res 1995;43:243-8.
6. Loeff DS, Imbeaud S, Reyes HM, Meller JL, Rosenthal IM. Surgical and genetic aspects of persistent müllerian duct syndrome. J Pediatr Surg 1994;29:61-5.
7. Wu HC, Chen JH, Lu HF, Shen WC. Persistent müllerian duct syndrome wtih seminoma: CT findings. AJR Am J Roentgenol 2000;174:102-4.
8. Vandersteen DR, Chaumeton AK, Ireland K, Tank ES. Surgical management of persistent müllerian duct syndrome. Urol 1997;49:941-5.
9. Gutte AA, Pendharkar PS, Sorte SZ. Transverse testicular ectopia associated with persistent Mullerian duct syndrome - the role of imaging. 2008;81:176-8.
10. Berkmen F. Persistent Mullerian duct syndrome with or without transverse testicular ectopia and testicular tumours. Br J Uro 1997;122-6.

Source of Support: Nil, **Conflict of Interest:** None declare.

Staying in touch with the journal

1) Table of Contents (TOC) email alert
Receive an email alert containing the TOC when a new complete issue of the journal is made available online. To register for TOC alerts go to **www.afrjpaedsurg.org/signup.asp.**

2) RSS feeds
Really Simple Syndication (RSS) helps you to get alerts on new publication right on your desktop without going to the journal's website. You need a software (e.g. RSSReader, Feed Demon, FeedReader, My Yahoo!, NewsGator and NewzCrawler) to get advantage of this tool. RSS feeds can also be read through FireFox or Microsoft Outlook 2007. Once any of these small (and mostly free) software is installed, add **www.afrjpaedsurg.org/rssfeed.asp** as one of the feeds.