

## CASE REPORT



# Imperforate hymen presenting as acute urinary retention in an adolescent girl: a case report

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## Abstract

An imperforate hymen is a congenital condition in which a solid membrane obstructs the vaginal introitus, separating it from the proximal uterovaginal tract. We report the case of a 12-year-old girl who presented with a five-month history of cyclical lower abdominal pain, a two-week history of progressively worsening difficulty with micturition, and complete urinary retention for two days before presentation. She had no prior history of vaginal bleeding and no family history of similar illness. Physical examination revealed a firm, well-defined, centrally located pelvic mass that was mildly tender and non-pulsatile, as well as a distended bluish membrane at the introitus. Abdominopelvic ultrasonography and an intravenous urogram were performed. Based on the clinical and radiological findings, a diagnosis of imperforate hymen complicated by haematocolpos, haematometra, acute urinary retention, and bilateral obstructive uropathy was made. The patient underwent hymenotomy using an X-shaped incision, with good postoperative recovery. She remained asymptomatic during six months of follow-up.

**Keywords:** Imperforate hymen, urinary retention, Radiological findings, Diagnosis.

## Introduction

An imperforate hymen is a congenital anomaly in which a solid membrane obstructs the vaginal introitus, separating it from the proximal uterovaginal tract.<sup>1</sup> First described by Ambroise Paré in 1633, it is classified as a vertical fusion defect; however, unlike other defects in this category, it does not arise from the Müllerian system.<sup>2</sup> The hymen originates from the embryonic vaginal buds of the urogenital sinus and is composed of vaginal and urogenital sinus epithelium separated by mesoderm.<sup>3</sup> Normally, canalisation establishes communication between the upper vaginal tract and the vestibule,<sup>4</sup> although the exact mechanism underlying the failure of this process remains unclear. An imperforate hymen is the most common obstructive anomaly of the female genital tract, with reported incidence estimates ranging from 1 in 1,000 to 1 in 10,000 in the general

population.<sup>5</sup>

Cases of imperforate hymen have been identified prenatally through ultrasound documentation of bladder outlet obstruction caused by hydrocolpos.<sup>6</sup> Nevertheless, despite recommendations for routine inspection of the external genitalia during the neonatal and early childhood periods, variations in hymenal anatomy frequently go unrecognised until menarche.<sup>7</sup>

Clinical presentation is variable, ranging from an incidental finding in an asymptomatic individual to evaluation for primary amenorrhea, abdominal or back pain.<sup>8</sup> Other presenting features include urinary retention and constipation. While cyclical abdominal pain is the most commonly reported symptom in adolescents, back pain and

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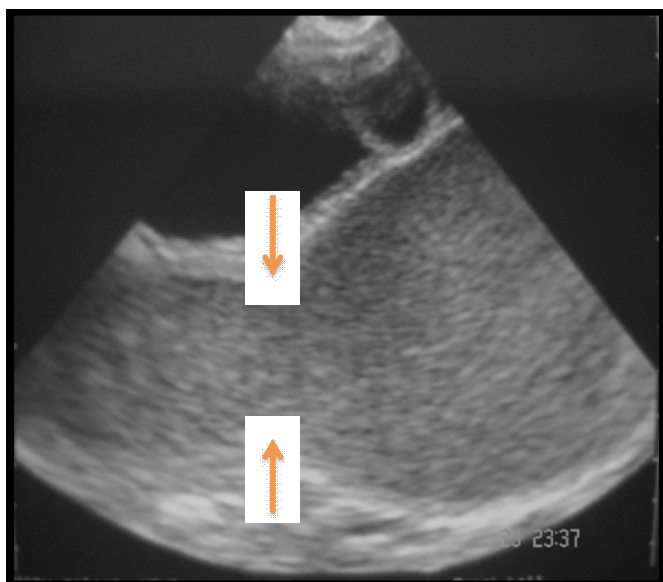


Fig. 1. Pelvic ultrasonography showed a uterus measuring 4.5cm in its anteroposterior diameter.

acute urinary retention have also been described and typically resolve following hymenotomy.<sup>7</sup>

Radiological imaging remains central to the evaluation of uterovaginal anomalies. In particular, the pivotal role of radiological investigations in establishing the diagnosis of imperforate hymen formed the basis for this report.

#### Case report

R.Y. is a 12-year-old girl who presented to the Accident and Emergency Department of the University of Maiduguri Teaching Hospital with a five-month history of cyclical lower abdominal pain, a two-week history of progressively worsening difficulty with micturition, and complete urinary retention for two days before presentation. There was no history of vaginal bleeding, and no family history of similar illness. Her mother received antenatal care at a primary health care facility and had an uneventful spontaneous vaginal delivery at term.

On general examination, the child was conscious but restless. She was slender, not pale or jaundiced, and there was no peripheral lymphadenopathy. Abdominal examination revealed a firm, well-defined, centrally located pelvic mass that was mildly tender to palpation and non-pulsatile. Inspection of the external genitalia showed a distended bluish membrane at the vaginal introitus.

Abdominal ultrasonography demonstrated both kidneys in normal position and with preserved contours, measuring  $9.4 \times 3.8$  cm on the right and  $9.8 \times 4.0$  cm on the left. There was moderate bilateral calyceal and ureteric dilatation, consistent with bilateral obstructive uropathy. However, renal parenchymal echogenicity was normal, with good corticomedullary differentiation. The liver, biliary tree, gallbladder, pancreatic bed, and spleen were all within normal limits. No ascites or para-aortic lymphadenopathy was observed.

Pelvic ultrasonography (Figure 1) revealed an enlarged uterus with an anteroposterior diameter of 4.5 cm, containing an endometrial collection with low-level internal echoes



Fig. 2. Intravenous urogram demonstrates both kidneys to be normal in position and outline. Excretion was prompt and satisfactory by both kidneys. The kidneys showed moderate clubbing of their calyces in keeping with grade 3 hydrocalycosis.

consistent with haematometra. The cervical canal measured 2.5 cm in diameter. A large, rounded cystic mass with low-level echoes was identified in the vaginal region, in keeping with massive haematocolpos. Both ovaries were normal in size and echotexture, and the pouch of Douglas was free.

Intravenous urography (Figure 2) demonstrated both kidneys in normal position and with preserved contours, measuring 10.0 cm and 11.0 cm in bipolar length on the right and left, respectively. Renal excretion was prompt and satisfactory bilaterally. However, there was moderate calyceal clubbing consistent with grade 3 hydrocalycosis. The ureters were visualised along their entire course.

Laboratory investigations, including full blood count, urine microscopy, and serum urea and electrolytes, were within normal limits. Based on the combined clinical and radiological findings, a diagnosis of imperforate hymen complicated by haematometra, haematocolpos, and bilateral obstructive uropathy was made. The patient subsequently underwent hymenotomy using an X-shaped incision, with an uneventful postoperative course. She remained asymptomatic during six months of follow-up.

#### DISCUSSION

An imperforate hymen is the most common cause of vaginal outflow obstruction, occurring in 0.1% of infant girls.<sup>5</sup> Although familial occurrence has been described,<sup>4</sup> no such association was identified in this index patient.

Vaginal outflow obstruction leads to retention of uterovaginal secretions, with the level of obstruction in the imperforate hymen occurring at the introitus and manifesting as a bulging membrane between the labia.<sup>7,9</sup> The retained contents are described as mucocolpos, haematocolpos, or pyocolpos depending on their nature. In the perinatal period, oestrogen-stimulated mucoid secretions result in mucocolpos,<sup>10</sup> whereas in adolescence, retained menstrual blood leads to haematocolpos and haematometra,<sup>7</sup> as observed in this case.

Neonates typically present with a bulging hymenal membrane and, in severe cases, a palpable, midline lower abdominal mass due to uterine distension.<sup>10</sup> Although this patient was an adolescent, a similar suprapubic mass was evident, likely reflecting the chronicity of the obstruction and the resultant marked enlargement of the uterovaginal contents.

The differential diagnosis of uterovaginal obstruction includes congenital anomalies of vaginal development, such as transverse vaginal septum and complete vaginal agenesis, which may be associated with syndromic conditions like Rokitansky-Küster-Mayer-Hauser syndrome.<sup>11</sup> However, no features suggestive of these anomalies were identified in this case. Non-congenital causes, including genital tract malignancies,<sup>8</sup> should also be considered and were excluded by ultrasonography.

Ultrasonography remains the essential initial imaging modality for confirming uterovaginal obstruction and may be performed via transabdominal, transperineal, or transrectal approaches.<sup>5</sup> Sonographic findings of haematocolpos or haematometocolpos, as seen in this patient, narrow the differential to imperforate hymen or transverse vaginal septum.<sup>7</sup> Although renal anomalies may accompany Müllerian defects, none were identified in this case. Instead, bilateral obstructive uropathy was demonstrated as a secondary effect of massive haematocolpos and mild haematometra, with intravenous urography confirming the absence of associated renal anomalies.

Prenatal diagnosis of imperforate hymen has been reported as early as 25 weeks' gestation. It is typically identified on ultrasound by a thin bulging membrane at the labia with associated vaginal distension, often detected during evaluation for foetal ascites or bladder outlet obstruction.<sup>5</sup> These findings are usually noted during an evaluation for foetal ascites and were thought to be the result of distal urinary obstruction. However, they can also be related to reflux of uterine contents through the fallopian tubes.<sup>4</sup> Ogunyemi reported that ascites and bladder outlet obstruction are the most common associated findings in the foetal period, while intestinal, cardiac, and anorectal anomalies have not been described in association with imperforate hymen.<sup>6</sup> In contrast, the present case was diagnosed in adolescence, with the patient remaining asymptomatic until age 12, when she first developed urinary retention.

Confirmation of an imperforate hymen relies on non-invasive imaging, particularly ultrasonography, to define the extent of vaginal outflow obstruction and exclude associated anomalies.<sup>9</sup> Although rare, combined anomalies such as an imperforate hymen and transverse vaginal septum may occur; further imaging, such as MRI, is reserved for cases in which ultrasound findings are inconclusive.<sup>10</sup> In this patient, the diagnosis was clearly established through clinical examination, ultrasonography, and intravenous urography. Distinguishing an imperforate hymen from a transverse vaginal septum is crucial, as the former presents with a thin distal membrane and is adequately treated by hymenotomy, whereas the latter involves a thicker proximal septum<sup>11</sup> requiring more extensive surgery and may affect future reproductive outcomes.<sup>10</sup>

Two surgical techniques are most commonly advocated: simple incision and small excision of the membrane. Simple incision of the hymen may be associated with postoperative stenosis, stricture, and thus, is not the method generally preferred at many centres.<sup>1</sup> Use of an X-shaped incision is the method of choice because of minimal postoperative complications.<sup>2</sup> This was employed in the management of this patient with a good outcome.

## CONCLUSION

A case of imperforate hymen in a 12-year-old girl with acute urinary retention was presented. The radiological features of an imperforate hymen were discussed. The invaluable role of non-invasive radiological modalities for early diagnosis and subsequent management was highlighted.

## PATIENT CONSENT

Written informed consent for publication of their clinical details was obtained from the patient and her caregiver.

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