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**Case Series**

# Conservative laparoscopic approach to paratubal cyst torsion in young girls: three cases of preserved fertility

**Khushbu Dubey, Satish Choudhury*, Prachi Gedam, Deepika Mangani, Avantika Gupta**

Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences, Bhopal, Madhya Pradesh, India

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***Correspondence:**
Dr. Satish Choudhury,
E-mail: satish.choudhury13@gmail.com



## ABSTRACT

Paraovarian and paratubal cysts, constituting approximately 10% of all adnexal masses, are typically benign and originate from the mesothelial lining or remnants of the Müllerian and Wolffian ducts. Although the incidence of torsion is lower in paraovarian cysts compared to ovarian cysts, it presents notable challenges, particularly in young women where fertility preservation is crucial. This report discusses three cases of torsed paratubal cysts successfully managed through laparoscopic techniques designed to prioritize fertility preservation. The surgical approach emphasized careful detorsion, aspiration of cyst contents for ease of manipulation, and the avoidance of energy devices during dissection to maintain vascular integrity in the ovaries and fallopian tubes. A strategic incision placed away from the fallopian tube further minimized the risk of injury, thereby safeguarding reproductive potential. Postoperative outcomes demonstrated effective pain relief, with histopathological findings of serous cystadenoma underscoring the importance of meticulous surgical techniques in preserving reproductive function in young patients.

**Keywords:** Parovarian cysts, Paratubal cysts, Laparoscopy, Adnexal torsion

## INTRODUCTION

Paraovarian and paratubal cysts, often used interchangeably, refer to cysts between the ovary and fallopian tube, accounting for approximately 10% of all adnexal masses.[1,2] These cysts are typically benign, primarily originating from the mesothelial lining. Additionally, they can develop from residual tissues of the paramesonephric (Müllerian) and mesonephric (Wolffian) ducts.[3] While the incidence of torsion is lower in paraovarian cysts compared to ovarian cysts, it remains a significant challenge, especially in young women where fertility preservation is crucial. Laparoscopic surgery offers a minimally invasive approach, offering benefits such as quicker recovery, reduced pain, and fertility-sparing possibilities. Key surgical principles include careful detorsion, cyst aspiration for ease of manipulation, and meticulous dissection to protect the fallopian tubes and ovaries. This report presents three cases of torsed paratubal cysts in young females, effectively managed with laparoscopy, highlighting the importance of fertility preservation and surgical precision.

## CASE SERIES

### *Case 1*

A 21-year-old female presented with a 7-month history of progressively increasing lower abdominal heaviness, which had acutely worsened over the past two days. She reported regular menstrual cycles. Ultrasonography revealed a large, simple cyst measuring 11×8×5 cm, distinct from the ovary. A pelvic magnetic resonance imaging (MRI) confirmed the presence of a large paratubal cyst (Figure 1a). Clinical examination indicated a palpable mass on the left side, associated with tenderness and guarding. Emergency laparoscopy revealed the cyst originating from the left mesosalpinx (Figure 1b), with the left fallopian tube stretched over it. The cyst pedicle had undergone torsion twice (Figure 1c), which was corrected,

and the cyst was aspirated due to its large size (Figure 1d). The cyst wall was then carefully dissected from the mesosalpinx using sharp and blunt dissection techniques without energy devices, thereby preserving the fallopian tube (Figures 1e and f). Postoperatively, the patient reported pain relief and was discharged the following day. Histopathological examination confirmed a serous cystadenoma.

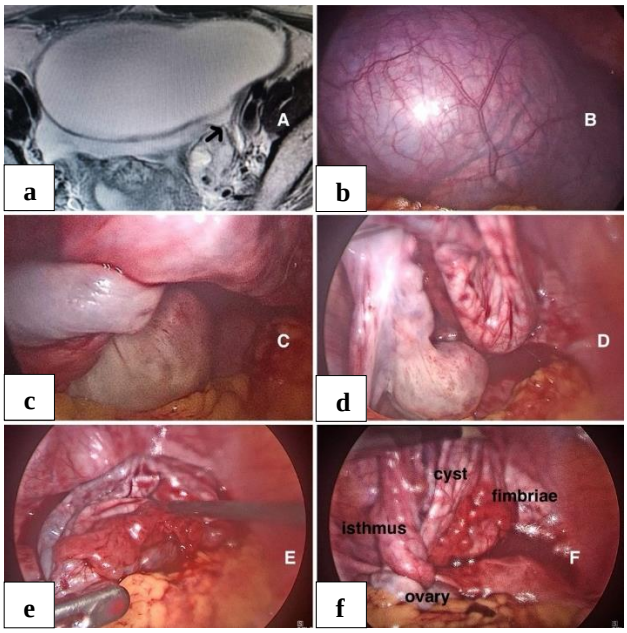


**Figure 1: (a) MRI of the pelvis showing the pedicle of the paraovarian cyst (black arrow); (b) visualisation of the enlarged paraovarian cyst; (c) observation of the torsed pedicle with two twists, showing the cyst positioned separately from the ovary; (d) post-suction view of the cyst contents, providing clearer anatomical relations with the ovary and fallopian tube; (e) dissection of the cyst wall from the mesosalpinx, with retracted fallopian tube; and (f) visualization of the cyst's relationship to the ovary and fallopian tube.**

***Case 2***

A 20-year-old female presented with a sudden onset of severe abdominal pain, occurring a day prior and accompanied by two episodes of vomiting. Initial imaging revealed a simple ovarian cyst, for which she was managed expectantly. Physical examination showed tenderness in the lower abdomen, prompting an exploratory laparoscopy to investigate a provisional diagnosis of ovarian torsion. Intraoperatively, a 7×5×5 cm paratubal cyst with torsion was identified, with the pedicle twisted twice (Figures 2a and b). Detorsion was performed, followed by a small incision on the cyst wall, positioned away from the fallopian tube using cold scissors. The cyst was subsequently dissected from the mesosalpinx (Figures 2c and d) using blunt and sharp dissection techniques, along with traction and counter traction, to remove the cyst wall after decompression (Figures 2e and f). The patient reported pain relief postoperatively and was discharged the following day. Histopathological analysis showed a serous cystadenoma.

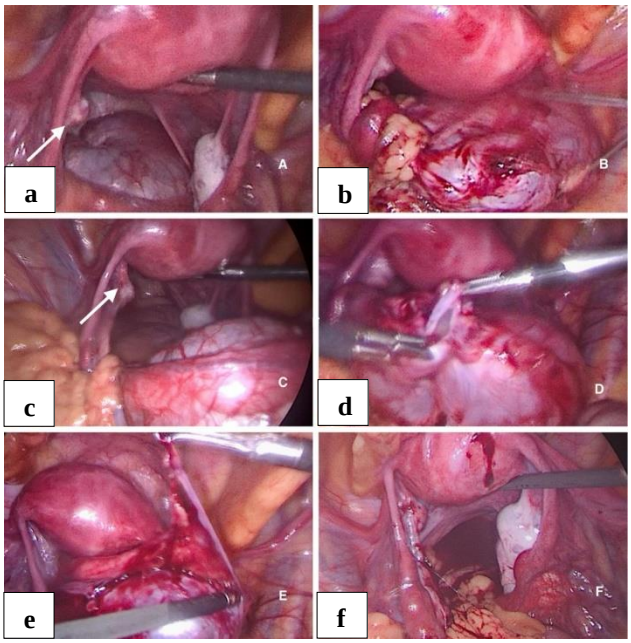


**Figure 2: (a) A small remnant ovary, marked by a white arrow, situated separated from the cyst on the left side; (b) torsion of the pedicle observed upon lifting the cyst; (c) detorsion performed, showing the remnant ovary positioned away from the cyst with the fallopian tube stretched across it; (d) incision made in the mesosalpinx; (e) blunt dissection separating the cyst capsule from the mesosalpinx; and (f) complete dissection revealing intact fallopian tubes.**

***Case 3***

A 20-year-old female presented with a sudden, severe abdominal pain persisting for one day, along with two episodes of vomiting. Sonography suggested the presence of an ovarian cyst, leading to initial expectant management. However, due to sustained lower abdominal tenderness, exploratory laparoscopy was performed with a provisional diagnosis of ovarian torsion. Intraoperative findings revealed a torsed paratubal cyst, measuring 7×5×5 cm, with two twists in its pedicle (Figures 3a and b). The cyst was detorsed, and a small incision was made on the cyst wall away from the fallopian tube, enabling careful dissection from the mesosalpinx (Figures 3c and d).

The cyst wall was removed using a combination of blunt and sharp dissection techniques, along with traction and counter-traction, following decompression (Figures 3e-g). Postoperatively, the patient reported significant pain relief and was discharged the next day. Histopathological examination showed a cyst wall lined by low columnar cells suggestive of serous cystadenoma.

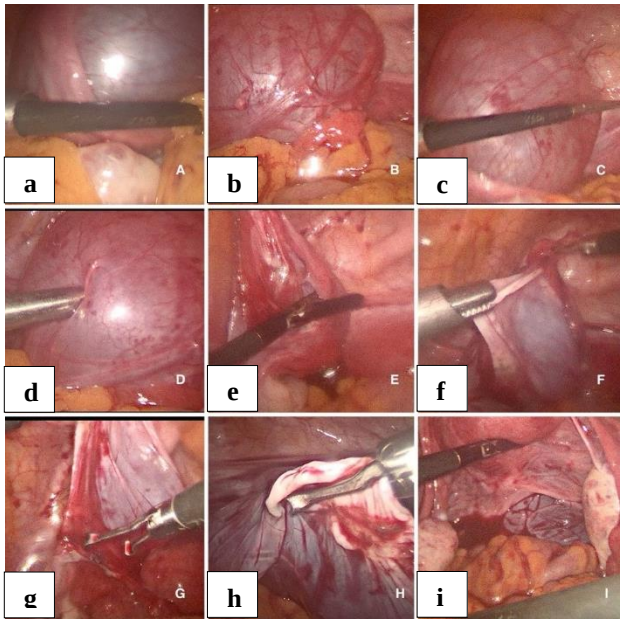


**Figure 3: (a and b) Fallopian tube stretched over the cyst, with the ovary distant from it; (c and d) detorsion and subsequent decompression; (e-g) incision of the mesosalpinx from the fallopian tube, followed by blunt dissection to separate the cyst wall from the mesosalpinx while the fallopian tube is held with Babcock's forceps; (h) para ovarian cyst after complete dissection; and (i) intact ovaries and fallopian tubes.**

## DISCUSSION

Paraovarian or paratubal cysts are more frequently observed in women in their third and fourth decades of life, with smaller cysts typically noted during these ages. In comparison, larger cysts are frequently seen in younger patients. Symptomatic complications, including hemorrhage and torsion, are significantly associated with cysts exceeding 5 cm in diameter.[4] Ultrasound is the primary diagnostic tool for adnexal masses, including paraovarian cysts; however, differentiating ovarian from paraovarian lesions remains challenging. A crucial sonographic feature for distinguishing paraovarian from ovarian cysts is the "sliding sign," which indicates that the cyst is separate from the ovary. Additionally, ultrasound is effective in differentiating adnexal masses from gastrointestinal or uterine pathologies.[5] Some studies suggest that the malignancy risk of paratubal cysts may increase for those larger than 5 cm. However, specific criteria beyond the international ovarian tumor analysis (IOTA) simple rules are currently limited.[3]

When ultrasound results are inconclusive, additional computed tomography (CT) or MRI is often required for accurate diagnosis. However, radiation exposure from CT scans poses a significant risk, especially in young patients. Studies indicate a 24% increase in cancer incidence over the following decade among young patients who have undergone CT imaging.[6] Given these risks, MRI is generally preferred to avoid radiation exposure. Despite advances in imaging techniques, definitive diagnosis of large paraovarian or paratubal cysts is frequently established only upon surgical exploration. A characteristic intraoperative finding in such cases is the presence of blood vessels crossing the cyst's surface, confirming its extra-ovarian origin.[7]

Besides, laparoscopy is the preferred approach for diagnosing and treating torsed paraovarian and paratubal cysts due to its minimally invasive access, precise control, and faster recovery times. This method facilitates direct visualization and assessment of adnexal viability, which is especially critical in young patients where fertility preservation is a priority. Recent studies have shown that detorsion, instead of salpingo-oophorectomy, effectively preserves ovarian function without increasing thromboembolic risks.[8] Surgical management should focus on careful blunt dissection to avoid trauma to ischemic and friable adnexa, thus safeguarding the ovarian and tubal blood supply. In more complex cases—such as those involving adhesions, endometriosis, or large cysts—meticulous technique is essential to prevent tubal dysfunction and protect the ovarian reserve, thereby optimizing future fertility potential. A case series described two young women with paraovarian cyst torsion who underwent laparoscopic detorsion and cystectomy, while two others received salpingectomy and adnexectomy, as tubal preservation was not desired.[9]

Furthermore, fertility-sparing surgery was successfully performed in all cases using laparoscopic techniques. A crucial factor in the success of these procedures was the avoidance of energy sources during cyst dissection, which minimized the risk of vascular compromise by preserving the blood supply to the fallopian tube and ovary. This approach is vital for maintaining ovarian reserve and tubal function, thus protecting future fertility. Additionally, a precise incision was made on the cyst, strategically located away from the fallopian tube to prevent tubal injury, further supporting fertility preservation. Aspiration was also employed to reduce cyst size, facilitating easier manipulation and reducing the risk of trauma to reproductive structures.

## CONCLUSION

In conclusion, the laparoscopic management of torsed paraovarian cysts in young patients enables effective fertility preservation through meticulous, energy-free dissection, strategic cyst incision away from the fallopian tube, and cyst decompression to facilitate manipulation. These techniques minimize iatrogenic trauma, maintain ovarian reserve, and preserve tubal function, thereby optimizing fertility outcomes in this patient population.

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