

CASE REPORT

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Post-radical hysterectomy ovarian torsion—A gynecological emergency: a case series

N. Harvey^{1*}, J. Nallathambi^{2*} and S. Kaushik^{3*}

Abstract

Background Ovarian torsion is a surgical emergency whereby the ovary twists, or torts, on its ligamentous support and potentially compromises vascular supply to both the ovary and Fallopian tube. It accounts for 2–3% of all acute gynecological emergencies, yet is a condition that is rarely reported to occur after hysterectomy.

While it is well established that ovarian torsion can occur after laparoscopic hysterectomy, we report on the rare occurrence of ovarian torsion occurring post the supposedly preventative ovarian transposition suspension procedure or ovariopexy. This highlights that further evaluation of laparoscopic surgical techniques are required to prevent this exquisitely painful gynecological condition occurring postoperatively.

Case presentation We report two cases of ovarian torsion post-primary laparoscopic radical hysterectomy performed for cervical malignancy. Both patients were Caucasian, multiparous, premenopausal female patients, aged 37 and 39 years old.

Ovarian transposition suspension was performed at the primary procedure to allow ovarian function to be preserved if the patient's required postoperative pelvic irradiation if surgically upstaged. Both patients underwent emergency laparoscopic detorsion, with one torsion due to reoccurrence of her cervical cancer.

Conclusions Adnexal torsion is estimated to occur between 1% and 8% in post-hysterectomy cases. It can be a difficult to diagnose condition, with prudent history-taking, relevant investigations, and a low threshold to consider laparoscopy forming essential clinical acumen. Unfortunately, the suspension of the ovaries post-hysterectomy does not exclude future ovarian torsion. With rising rates of cervical cancer in premenopausal women, reportedly increasing by 37% in the 25–34 age range in the United Kingdom (National Cancer Registration and Analysis Service, Public Health England, 2021), further research is needed to improve techniques to allow for safe ovarian conservation for these patients while undergoing operative treatment of cervical cancer.

Keywords Case report, Ovarian torsion, Gynecological emergency, Postoperative risk, Laparoscopic hysterectomy

*Correspondence:

N. Harvey
Naomi.harvey2@nhs.net
J. Nallathambi
j.nallathambi@nhs.net
S. Kaushik
sonali.kaushik@nhs.net



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Introduction

Ovarian torsion is a surgical emergency whereby the ovary twists, or torts, on its ligamentous supports and potentially compromises vascular supply to both the ovary and Fallopian tube [1]. It accounts for 2–3% of all acute gynecological emergencies [2]. It is a clinical diagnosis, yet the use of color Doppler ultrasonography has been viewed as a clinical adjunct to support the diagnosis of ovarian torsion [3]. However, this modality should be used with caution and not replace clinical acumen. It has been shown that color Doppler ultrasonography is not reliable to exclude ovarian torsion, as absent Doppler flow was only seen in 18.6% of cases of ovarian torsion, suggesting it has low sensitivity and negative predictive value [4].

While it is reported to rarely occur after the patient has had a hysterectomy, we report a series of two cases of ovarian torsion post-primary laparoscopic radical hysterectomy performed for cervical malignancy. Ovarian transposition suspension was performed at the primary procedure to allow for ovarian function to be preserved if the patient's required postoperative pelvic irradiation if surgically upstaged. These cases highlight that current techniques to perform ovarian suspension need to be reviewed. It is critical to prevent these patients also undergoing ovarian torsion, which is accompanied by a repeat laparoscopy or even laparotomy, with the physical risk and mental anguish this can entail. As clinicians, a high degree of suspicion with short recourse for early intervention is recommended.

Background

Ovarian torsion is a gynecological emergency in which it is often challenging to make a definitive diagnosis as clinical symptoms can be nonspecific. Early diagnosis and intervention often requires a diagnostic laparoscopy, de-torsion, and resuspension, which may help the ovaries survive by preserving blood supply. By maintaining the circulation to the ovary, this slows down the rate of tissue injury and leads to an ischemia/reperfusion (I/R) injury [5]. In an IR injury, the ischemia in the ovary allows for a state of anaerobic metabolism, which results in a lower production of ATP and affects ion channel function. Once reperfusion occurs by detorsion, excessive free oxygen radical formation follows and reactive oxygen species (ROs) cause autophagy, mitoptosis, necrosis, necroptosis, and apoptosis, resulting in cell death. However, live follicles have been found in clinically necrotic ovaries and currently the surgical aim should be detorsion.

While the incidence of torsion following hysterectomy is reportedly low, with a prevalence of 7.91 per 1000 hysterectomies [6], literature suggests laparoscopic approaches may have a higher incidence of adnexal

torsion post-surgery [7]. Some authors suggest additional ovarian suspension during the hysterectomy may reduce this risk.

We present two cases of laparoscopic-confirmed ovarian torsion despite ovarian suspension being performed during the patients' primary laparoscopic hysterectomy.

Case presentation

Case 1

A 39-year-old Caucasian female patient presented with acute abdominal pain, night sweats, significant weight loss, and dyspnoea.

She had been diagnosed with squamous cell carcinoma (SCC) of the cervix stage 1b1 5 years earlier, and had undergone elective total laparoscopic radical hysterectomy (TLRH) and bilateral pelvic lymphadenopathy with ovarian transposition in 2015.

During the acute presentation, computed tomography (CT) abdomen and pelvis (Fig. 1a) showed "6 cm mixed density mass in left iliac fossa abutting left colon and small bowel with associated surgical clips—this represents transposed ovaries."

She underwent emergency laparoscopy, which confirmed a tortured left ovary and Fallopian tube that was adherent to the left pelvic side wall, colon, and mesocolon. The left ovary could not be safely dissected from the colon, thus the patient proceeded to a left salpingo-oophorectomy with an anterior resection and anastomosis of colon to rectum. Histology showed grade 3 SCC consistent with metastasis from previous cervical cancer in left ovary and Fallopian tube infiltrating the adherent colon.

Case 2

A 37-year-old Caucasian female patient presented 3 months after her primary surgery with severe pelvic pain and peritonitic abdomen on examination. She had undergone TLRH with bilateral pelvic lymphadenopathy with ovarian transposition following diagnosis of invasive SCC of the cervix stage 1b1.

She underwent an ultrasound (USS) (Fig. 2a), which showed a 6.5 cm × 5.2 cm ovary in the right mid abdomen with no color Doppler flow. The patient was noted to be markedly tender during scanning of this area. CT abdomen and pelvis (Fig. 2b) showed both ovaries lying close to each other in the epigastrium, with the more lateral ovary being grossly enlarged, measuring 7 × 6 × 6 cm with no surrounding inflammatory change but pelvic free fluid. She proceeded to diagnostic laparoscopy (Fig. 2c), which confirmed right ovarian torsion where the ovary had tortured on its pedicle, resulting in a hematosalpinx. This patient had right laparoscopic salpingo-oophorectomy and the histology confirming acute adnexal torsion.

Case 1



(a): CT scan showing 6cm LIF mass with evident surgical clip

Fig. 1 a Computed tomography scan showing 6 cm LIF mass with evident surgical clip (Red arrow is pointing to the surgical clip)

Investigations

Case 1

See Fig. 1

Case 2

See Fig. 2

Differential diagnosis

Patients can present with a myriad of symptoms post-laparoscopic hysterectomy, and abdominal pain post-surgery is a common presentation [8]. The perhaps more common presentations include constipation, urinary retention or infection, diaphragmatic irritation causing shoulder pain, or abdominal infection. Other more concerning differentials can include deep infection causing an abscess or collection, hemorrhage, and injury to other organs such as bowel/bladder or ureter [9]. The clinician should consider the timeframe of presentation post-surgery and the extent of the operation. Where there has been manipulation of the ovaries and their ligaments, ovarian accident is an important differential to investigate.

Outcome and follow-up

Case 1

This patient underwent adjuvant chemotherapy (four cycles of cisplatin and topotecan) to reduce risk of recurrence. She remains under the care of the clinical

oncologists, with her annual CT scan showing no evidence of recurrence.

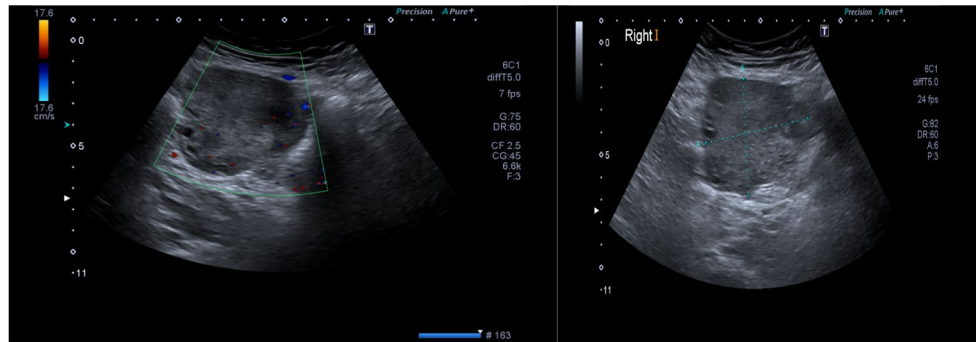
Case 2

The histology from this case was benign in nature. She remains under gynecological oncology with 6-month follow-ups and no evidence of disease reoccurrence.

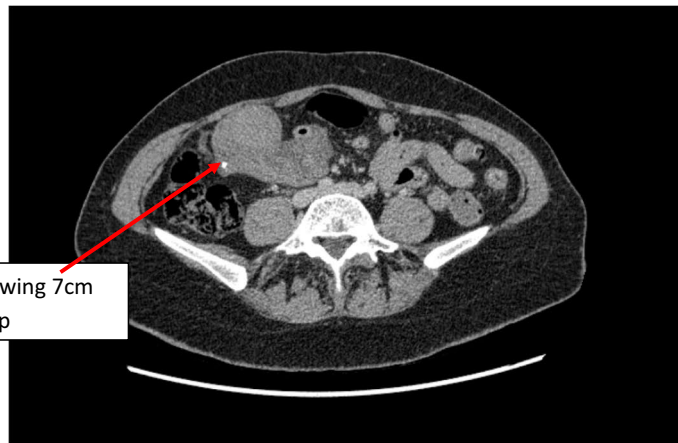
Discussion

A systemic review by Asfour *et al.* [10] found that hysterectomy was not a risk factor for adnexal torsion. However, it is estimated that it occurs between 1% and 8% of postoperative cases [6]. Evolving research into this area takes into account the different surgical techniques of hysterectomy.

These approaches to include abdominal, vaginal, traditional laparoscopic, robot-assisted laparoscopic, and vaginal natural orifice transluminal endoscopic surgery (vNOTES) [11]. There are multiple influencing factors when deciding on approach such as clinical indication, the patient, surgical skill, and patient preference. The traditional vaginal approach is viewed to have the quickest recovery of all modalities, yet it is no longer the preferred approach for benign or early malignant conditions. Minimally invasive surgery, such as laparoscopy, is associated with less perioperative morbidity compared with abdominal hysterectomy [12], with significant lower levels of postoperative pain and use of analgesia [13]. Laparoscopy is associated with reduced blood loss, postoperative complications, inpatient hospital stay, and cosmetic results [11].

Case 2

(a): USS scan showing 6.5cm x5.2cm right ovary with absent doppler colour flow



(b): CT scan showing 7cm LIF mass with surgical clip



(c): Laparoscopic image of ovarian torsion with associated haematosalpinx

Fig. 2 **a** Ultrasound (USS) scan showing 6.5 cm × 5.2 cm right ovary with absent Doppler color flow. **b** CT scan showing 7 cm LIF mass with surgical clip. **c** Laparoscopic image of ovarian torsion with associated hematosalpinx (Red arrow is pointing to the metal surgical clip)

However, it was reported that laparoscopic hysterectomy has a significantly higher risk for adnexal torsion than the more traditional abdominal or vaginal approach [14]. Valentine *et al.* [15] reported the prevalence of post-hysterectomy ovarian torsion after

laparoscopic approaches to be 86%, 9% after abdominal, and 6% after vaginal hysterectomy. They reported that adnexal torsion can occur in up to 1% of postoperative cases. Furthermore, they acknowledged that this percentage only reflects the symptomatic cases of torsion and does not account for any asymptomatic cases.

Potential factors that may contribute to ovarian torsion post-laparoscopic hysterectomy are (1) surgical technique in mobilizing the ovary, (2) ovarian trauma, and (3) adhesion formation post-laparoscopy [6].

Laparoscopic technique has been showed to reduce postoperative adhesions due to the reduced tissue manipulation [16] and higher humidity in the abdominal cavity [17]. However, laparoscopic hysterectomy may cause higher rates of ovarian torsion due to suture material, for example, polyglycolic acid suture causing more material adherence and leading to infective adhesions [18].

The Laparoscopic Approach to Cervical Cancer (LACC) trial investigated whether survival outcomes after minimally invasive surgery (laparoscopic or robot-assisted hysterectomy) were equivalent to those after open abdominal radical hysterectomy for patients with early stage cervical cancer. This randomized control trial unexpectedly found that minimally invasive radical hysterectomy was associated with 6.6 times greater likelihood of death, lower rates of disease free survival, and higher rate of locoregional reoccurrence and overall survival than open surgery [19]. They suggested several potential reasons for inferior oncological outcomes in the minimally invasive group, such as use of uterine manipulator associated with tumor spillage and insufflation gas effect on tumor cell growth, which was also reported by Kong *et al.* [20]. However, it must be said that the LACC trial definitely had a negative effect on the learning curve for surgeons [21], as it led to a substantial reduction in the use of minimally invasive surgery for cancer [22].

Furthermore, Ravid *et al.* suggested that performing concomitant prophylactic salpingectomy during laparoscopic hysterectomy contributed to rising rates of ovarian torsion. This approach became popular and played a role in preventing post-menopausal ovarian cancer [23]. However, by performing a salpingectomy, the ovary becomes solely supported on the infundibulopelvic ligament, which may allow for greater rotation of the ovary on its axis. Another important surgical technique during laparoscopic hysterectomy is wide fenestration of the broad ligament, which can also lead to increased ovarian mobility.

Interestingly, Ravid *et al.* commented that “ovariopexy” would not prevent all cases of post-hysterectomy adnexal torsion, and they felt that if it was performed, the patients should be premenopausal. Additionally, Mashiach *et al.* comment on the role of oophoropexy as a potential way of preventing torsion, however, they consider it when the ovary is too mobile or the IP ligament is significantly lengthened. In our case report, both premenopausal patients had underwent ovariopexy during laparoscopic hysterectomy, yet they still experienced torsion.

Conclusion

Ovarian torsion can be a difficult-to-diagnose gynecological emergency. Prudent history-taking and relevant investigations are essential steps, with a low threshold for diagnostic laparoscopy.

Suspension of the ovaries post-hysterectomy does not exclude future ovarian torsion, and in fact, laparoscopic approach and techniques can increase risk of ovarian torsion. Further research is needed in techniques of ovarian conservation in operative treatment of cervical cancer.

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Author contributions

Harvey wrote the article with the help of Nallathambi. Kaushik had the original idea for the case report and provided guidance.

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Availability of data and materials

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Declarations

Ethical approval and consent to participate

Not applicable. The authors have submitted a Consensus-based Clinical Case Reporting (CARE) Guideline.

Consent for publication

Informed consent was obtained from the patients for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

Not applicable.

Author details

¹Obstetric and Gynaecology ST7, Princess Royal Hospital, Haywards Heath, UK. ²Obstetric and Gynaecology Consultant, Conquest Hospital, Hastings, UK. ³Consultant Gynaecology Oncologist, Royal Sussex Hospital, Brighton, UK.

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