Should the ovary always be conserved in torsion? A tertiary care institute experience

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Aim: The aim of this study was to analyze our experience in conserving ovarian tissue in cases of ovarian torsion, irrespective of grade of necrosis at exploration.

Materials and methods: All children with a diagnosis of ovarian torsion admitted to our hospital from January 2009 to January 2013 were included. Patients with underlying ovarian pathology were excluded. Results: There were 13 torsions in 12 children (one bilateral). All underwent detorsion with or without evacuation of hematoma. Follow-up ultrasonography (USG) with color Doppler was done for all 13 ovaries, which showed an ovary with good vascularity and follicular development in 12 ovaries (92%). In 76% (10 of 13) of cases, intraoperatively, the ovary was judged to be moderately to severely ischemic/necrotic. Yet, follow-up sonograms showed the ovary with follicular development in all cases except one (7%). There were no major complications in our series.

Conclusion: Simple detorsion, instead of traditionally advocated oophorectomy, was not accompanied by an increase in morbidity. On follow-up, almost all patients studied had functioning ovarian tissue despite the grave ischemia observed intraoperatively. Detorsion should be the procedure of choice for all cases of simple ovarian torsion in children.

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Torsion of ovary is a surgical emergency in prepubertal girls. It accounts for up to 2.7% of all cases with acute abdominal pain in children [1]. Clinical presentation of torsion of ovary masquerades as any acute abdomen surgical or otherwise. One must approach all prepubertal girls with an acute abdomen with a high degree of suspicion of torsion of ovary. The earlier recommended treatment of ovarian torsion was oophorectomy [2,3]. Recent reports, describe ovarian conservation with untwisting of the ischemic adnexa as a safe and successful procedure [4–6]. The arguments in favor of oophorectomy are: risk of missing an underlying malignancy, thromboembolism after detorsion and a belief that a grossly black hemorrhagic adnexa is irreversibly damaged [2–4]. Our primary aim was to analyze whether irreversible ovarian damage was inevitable or not with objective follow-up data following conservative management of ovarian torsion.

1. Materials and methods

All children with diagnosis of ovarian torsion admitted to our hospital from January 2009 to January 2013 were included. A plain radiograph of the abdomen and pelvis, and abdominal ultrasonography (USG) with Color Doppler were obtained. After USG, the patient was taken to the operating theater (OR) on an emergency basis and tumor markers were obtained in all patients as a protocol. Laboratory work was done according to an institutional protocol. Patients with underlying ovarian malignancy or cyst were excluded (i.e., a case of torsed gonadoblastoma was excluded). Laparoscopy was the initial mode of management followed by laparotomy if required. Data regarding patients’ demographics, duration of symptoms, site of pain, atypical symptoms, investigations, complications, and length of stay were obtained. Also, time taken from presentation to hospital to surgery was tabulated. To reduce subjective operator bias, surgery was performed by designated staff members.

In addition, torsion of ovary was graded as follows:

Grade 1: Slightly discolored, normal size ovary, which promptly reverted to normal color after detorsion.

Grade 2: Dark red to brown, mildly enlarged ovary, which became hyperemic with multiple pin-point petechiae after detorsion.

Grade 3: Brown to black, grossly enlarged ovary with hematoma with slight improvement in color, small pin-point oozing after detorsion and hematoma evacuation.

Grade 4: Completely black, grossly enlarged ovary with hematoma and no improvement in color after detorsion and hematoma evacuation.

All ovaries underwent either simple detorsion or detorsion with evacuation of hematoma. None of the ovaries or contralateral ovaries...
were fixed. On follow up at 3 months, all girls were evaluated with USG and color Doppler. Data were analyzed.

2. Results

There were 13 torsions in 12 children with age ranging from 6 to 12 years (mean = 8.84). Pain (87%), nausea (56%), and vomiting (56%) were the most common presenting symptoms. Of these, one presented with constipation and mild abdominal pain and another with left flank pain. A palpable mass on presentation was noted in one girl. The time from onset of symptoms to hospital ranged from 14 to 54 hours (mean = 31 hours). The time lapse from presentation to hospital until surgery was 4–30 hours (mean = 10 hours).

Diagnostic USG with color Doppler was done in all patients, which showed ovarian torsion with decreased vascularity in all and ovarian enlargement with hemorrhagic collection in 10 ovaries (70%). The diameter of ovary measured by USG averaged 5.1 cm (range 3.9–12 cm). In one patient with constipation and mild abdominal pain, initial USG missed the torsion. Review USG for persistent pain showed torsion. The torsion was right-sided in 46% and left sided in 54%. Laparoscopy was performed in 84% of patients; 28% cases required conversion to an open procedure, laparotomy was primarily done in a single patient and another presented as an incarcerated right inguinal hernia and required open herniotomy.

Using the aforementioned grading system for ovarian ischemia, the following results were obtained: 3 of 13 (24%) ovaries were graded as grade 2 ischemic (Fig. 1) and, 5 of 13 (38%) as grade 3 (Fig. 2). Grade 4 ischemia was present in 5 (38%) ovaries (Fig. 3A). Three patients underwent simple detorsion while 10 (76%) required detorsion with evacuation of hematoma and unroofing of the cavity (Fig. 3B). Median postoperative stay was 72 hours (range 48–120 hours). One patient had postoperative ileus with low-grade fever, and one patient had ileus and wound infection (both were open laparotomies). Six patients had low-grade fever for a day or two postoperatively. All were managed conservatively.

Follow-up was available in all 12 patients (13 ovaries). All the patients were asymptomatic at 3 month follow-up. Repeated USG with color Doppler showed ovarian tissue with good vascularity and follicular development in 12 ovaries (92%) (Fig. 4A and B). However, in the child with bilateral asynchronous occurrence, left ovarian tissue was not identified on follow up USG. As noted almost 76% ovaries were initially labeled as having moderate to severe necrosis (grade 3 or 4), but of these 10 ovaries, 9 ovaries had ovarian tissue with good vascularity and with follicular development on follow up USG with color Doppler.

3. Discussion

Torsion of ovary is a surgical emergency. The usual presentation is lower abdominal pain, which may be indistinguishable from acute appendicitis when the pain is located in the right lower quadrant [7]. Nausea and vomiting, mild fever, and leucocytosis are associated features. The reported incidence of ovarian torsion is 2.7% in the general population. As differential diagnosis includes appendicitis, gastroenteritis and renal colic, diagnosis is frequently delayed. USG with color Doppler remains the most useful investigation.

Traditionally, the management of ovarian torsion was excision of the twisted ovary for fear of (1) embolic phenomenon on detorsion, (2) leaving a malignancy behind, and more importantly, (3) the belief that grossly black hemorrhagic ovary was irreversibly damaged [7–9].

Recent studies, however, advocate conservative management by detorsion as the treatment of choice in prepubertal girls. Oelsner et al.
followed up 40 patients with a mean age of 22.5 years (range, 2.5–38 years) who had detorsion of a bluish-black adnexa. On follow-up USG, 35 showed normal sized ovary with follicles [10]. In another study, of 8 premenarchal girls who underwent detorsion of a torsed ovary, 7 showed a normal sized ovary with good perfusion on follow-up USG [11]. Detorsion with conservation of ovarian tissue for ovarian torsion even with delayed diagnosis has been recommended by Templeman et al., with USG showing good results [8].

In another review of 66 cases of ovarian torsion, by Descargues et al., favorable results were seen in 97% of the patients treated conservatively based on morphologic (USG, laparoscopy) or functional assessment (pregnancy) [12]. Our results also show safe and satisfactory recovery after untwisting the ischemic ovary, regardless of the on-table gross appearance. 9 of 10 (90%) of ovaries graded by us as moderate to severe necrosis (grade 3 or 4); showed ovarian tissue with good vascularity and follicular development on followup.

The literature describes one case of pulmonary embolus in a patient with ovarian vein thrombosis owing to ovarian torsion [1,4]. Roday et al. reported the incidence of pulmonary embolus is 0.2% of cases of ovarian torsion treated by ovarian resection. The incidence was the same after detorsion [1]. With regard to thrombotic or embolic risks, a thorough review of the literature between 1900 and 1999 found only two cases of pulmonary embolism associated with ovarian torsion after laparotomy and adnexal resection, and there have been no reported events of thromboembolism after detorsion [13,14]. This suggests that the risk of thromboembolism in the setting of ovarian torsion is perhaps overestimated. None of our cases developed pulmonary embolus. No malignant neoplasm was identified in any of our patients. After detorsion, the most common postoperative morbidity was fever followed by adynamic ileus. The concern to leave a malignancy behind is valid, yet, all malignancies that have been reported in a twisted ovary were in adult patients with an estimated risk of 2%, which is lower than the 9.4% malignancy rate reported in the series of 102 consecutive ovarian masses by Cass et al. [7,15]. Descargues et al. report that normal ovaries or ovaries with benign pathology were responsible for 97% of ovarian torsions [12]. An ovary with malignancy rarely present with torsion, one explanation being that malignant lesions cause more inflammation and fibrosis leading to adherence to surrounding structures [7,16]. Therefore, a conservative approach should be followed up with USG 6–12 weeks postoperatively. Any suspicious lesion can be addressed at that time [4,7].

The risk of metacronous torsion is variable and unpredictable. In our study, one of 12 patients (8.33%) had asynchronous torsion, 9 months after the first episode. In this case the left ovary was involved first, followed by the right ovary. Contralateral oophoropexy could, theoretically, prevent the risk of asynchronous torsion, although no studies have proven its success or impact on future fertility. The risk of asynchronous bilateral ovarian torsion, however small, should deter most surgeons from performing an oophorectomy, as the impact of bilateral oophorectomy on the future physical, social, and emotional development of a pubescent girl cannot be underestimated [7,17].

In oophoropexy, the ovary is sutured to the uterine serosa, the broad ligament, or the pelvic sidewall using non-absorbable material [7,17]. Literature does not advocate prophylactic contralateral
ophoropexy, and questions regarding its success and effects on future fertility remain unanswered. There is increasing evidence of successful oophoropexy in patients receiving pelvic irradiation for treatment of malignancy for shielding the ovary and not for preventing torsion.

A high index of suspicion and early diagnosis affords better salvage of the ischemic ovaries. Hence, ovarian torsion should be considered in every girl presenting with lower abdominal pain. USG remains the most useful investigation, and loss of blood flow on Doppler is diagnostic. Ovarian tissue conservation is strongly recommended [1,4,7,15]. Gross appearance of ovary and intra-operative grading of ischemia by the surgeon are not reliable indicators of ovarian viability. Ovarian malignancy occurs rarely and should not delay the surgical procedure in a girl with ovarian torsion. Repeat USG can be done postoperatively and an appropriate intervention performed if required [4,7]. Thus, we conclude and advocate maximal conservation and salvage of ovarian tissue for all cases of ovarian torsion in prepubertal girls, irrespective of the intraoperative bleak appearance of the ovary. Thus, potential infertility and negative impact on physical, social, and emotional impact on prepubescent girls can be avoided.

Detorsion with maximal conservation of ovarian tissue should be the procedure of choice for all cases of simple ovarian torsion in children, irrespective of the perceived degree of ischemia.

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References