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Ovarian torsion. Management and ovarian prognosis: a report of 45 cases

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Abstract

Background/Purpose: Ovarian torsion in childhood and adolescence is a rare entity. Traditionally, treatment is oophorectomy. The aim of this study was to evaluate ovarian outcome and to propose a decision-making protocol for suspected ovarian torsion.

Methods: Between January 1986 and December 2007, 45 ovarian torsion cases in 40 girls were operated on. In all the cases, when the ovary was preserved, patients were clinically and ultrasonographically followed up for several months.

Results: Median age was 11 years. Median delay between the first symptoms and surgical procedure was 3 days. There was a statistical difference ($P = .0003$) between the mean of the largest diameter of twisted normal ovary and the mean of the largest diameter of twisted diseased ovary. Underlying pathology was benign in 22 cases and low-grade malignancy in 2 (one grade II immature teratoma and one steroid cell tumor). Conservative management was performed in 26 cases. At follow-up, 17 ovaries were follicular, 7 being black-bluish during surgery.

Conclusions: Conservative approach after detorsion of black-bluish ovaries is safe and effective in children. Although very unlikely, the fear of missing malignancy must incite to proceed with caution and can lead, when the size of the twisted ovary is greater than 75 mm, to prefer laparotomy to laparoscopy.

Ovarian torsion in childhood and adolescence is a rare entity. Traditionally, treatment is oophorectomy [1-4]. This management is based on (1) the fear of thromboembolic phenomena because of the release of thrombi from the thrombotic vessels in the twisted pedicle, (2) the idea that severely ischemic ovary is nonviable, and (3) the fear of missing a malignancy.

Yet, already in 1946, Way [5] showed that detorsion of ovary was safe and effective. Later, Shalev et al [6], Oelsner et al [7], and Zweizig et al [8] confirmed these results in series including a few pediatric patients. This conservative management was performed in all instances when, after detorsion, the ovary showed gross visual evidence of

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vascular perfusion. Furthermore, Shalev et al [6] proposed more aggressive conservative attitude and recommended saving ischemic-hemorrhagic ovary without waiting for signs of adnexa recovery. Then Oelsner et al [7] claimed that the black-bluish macroscopic appearance of ovary is not a true indicator of the degree of ischemia.

Pediatric reports of conservative treatment of black-bluish ovaries are very rare and concern almost exclusively children who lost one ovary during first episode of ovarian torsion and experienced asynchronous bilateral ovarian torsion [9-12]. We report here our series of 40 pediatric patients with ovarian torsion. This retrospective study was undertaken to evaluate ovarian prognosis and propose decision-making protocol for suspected ovarian torsion in childhood.

1. Materials and methods

Charts of 40 patients who presented 45 ovarian torsion cases treated from January 1986 to December 2007 in the Department of Pediatric Surgery, Toulouse, France, have been reviewed retrospectively. Neonates with ovarian torsion were excluded. This torsion results usually from complication of a fetal ovarian cyst and has been reported separately [13].

Type and duration of symptoms, diagnostic modality, age at surgery, operative procedures, pathology report, and follow-up have been recorded. When a mass effect was observed, tumor markers (α-fetoprotein and B human chorionic gonadotrophin) were assessed on blood samples.

During surgery, ovarian pedicle was untwisted and ovarian color was watched for 10 minutes. Until the end of 2001, only ovaries that regained their almost normal color and those unique ones, whatever color change (2 cases), were kept into the abdomen. Since 2002, ovaries with normal relationship with uterus and its suspensory ligament and without necrolysis were kept into the abdomen, even if they were severely ischemic-hemorrhagic, usually the so-called black-bluish ovaries.

Those patients whose ovaries have been preserved were clinically and ultrasonographically followed up for 14 months (6-99 months) (median, range). First, ultrasonography was carried out 6 to 8 weeks after detorsion with full bladder but without any catheter. Upon ultrasound (US) assessment, the ovaries were recognized on the follicular structure [14] (cysts or follicles measuring <10 mm in diameter) or were undetectable (absence of a detectable follicular or homogeneous ovarian structure). Further controls were performed every 3 months until the finding of a normal follicular ovary or with an appropriate timing according to underlying pathology. Subsequent examinations were proposed to parents until the end of puberty.

The largest diameter of ovarian enlargement was measured by ultrasonographic scan and analyzed using the Stata version 8.0 program (Statacorp, College Station, Tex). The largest diameter normality was assessed with Shapiro-Wilk test and the variance with equality of variance *t* test. The largest diameter of ovarian enlargement when torsion occurred on previously normal ovary was compared with the largest diameter of ovarian enlargement when torsion occurred on a previously diseased ovary. Because the distribution of the largest diameter was Gaussian and the variances between the 2 groups were not statistically different, we compared the largest diameter in the 2 groups with the Student *t* test for equality of mean. We used the receiver operating characteristic analysis to assess the cutoff that provides the best specificity and sensibility in our sample. The area under the receiver operating characteristic curve has been calculated to assess the largest diameter as a good discriminating indicator to classify patients in groups.

2. Results

Median age was 11 years (range, 22 months to 17 years). In 51%, torsion occurred on right ovary (n = 23), and in 49%, torsion occurred on the left one (n = 22).

In almost all cases, 44 of 45 children presented with an abrupt onset of abdominal pain; in 60% of cases, vomiting was synchronous with pain onset. Fever was rare and followed the initial discomfort by several hours. In one case, a calcification disclosed on a plain x-ray study for scoliosis revealed a wandering ovary because of autoamputation of the left adnexa in a 9-year-old girl. In 7 cases, a history of previous intermittent abdominal pain has been found.

Ovarian torsion was diagnosed during surgery for appendicitis in 7 cases. Abdominal US obtained in all other children disclosed the presence of a pelvic or abdominopelvic mass. Small cystic structures around the periphery of the ovary, a specific sonographic sign of ovarian torsion on previously normal ovary described by Graif et al [15], were only found in 6 cases.

Median delay between the first symptoms and surgical intervention, known in 40 cases, was 3 days (9 hours to 19 days). Laparotomy was performed in 20 cases and laparoscopic procedures in 14 (31%) cases of 45, whereas laparoscopic procedures converted to open were carried out in 11 (24%) cases of 45.

During surgery, after detorsion, ovary remained black-bluish in 23 cases. Macroscopic appearance was unknown in 2 cases because surgery for first episode was performed in another hospital. In one case, the ovary was wandering and calcified, and in another case, it presented partial necrolysis. Usually, ovary was twisted along with uterine tube except in 2 cases of 45, where ovary was twisted alone.

The largest diameter of ovarian enlargement is shown in Fig. 1.

When ovarian torsion occurred on a previously normal ovary (21 torsion cases in 18 patients), the median of the