

Laparoscopy Versus Laparotomy for Detorsion and Sparing of Twisted Ischemic Adnexa

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ABSTRACT

Background: Torsion of the ovary is an urgent event for fertile women. Until recent years, the common treatment for twisted ischemic ovaries was salpingo-oophorectomy. We have demonstrated in the past that the ovary can be salvaged provided detorsion is performed. We studied the outcome of women undergoing minimal surgery for ischemic ovaries versus the extended procedure including cystectomy in respect of ovarian function and fertility performance.

Methods: We retrospectively studied 102 women who underwent surgery for torsion of the ovary in which the macroscopic appearance of black-bluish ischemic adnexa was encountered during surgery. Detorsion without removal of the adnexa or the ovary was performed by laparoscopy in 67 patients and by laparotomy in 35 patients. Patients' files were reviewed for immediate and late outcomes. Patients were examined postoperatively with vaginal ultrasound for ovarian follicular function. Data concerning patients' further surgeries or in vitro fertilization were retrieved from the charts as well.

Results: Febrile morbidity was approximately 15% and 29% in the laparoscopy and laparotomy groups, respectively. Hospital stay was 2.1 ± 1.2 and 7.4 ± 1.5 days in the laparoscopy and laparotomy groups, respectively ($P < 0.001$). Ultrasound follow-up was available in 60 of 67 patients who underwent laparoscopy and in 32 of 35 patients treated by laparotomy. Normal-sized ovaries with follicular development were encountered in the detorsed side in 93% and 91%, respectively. Normal macroscopic appearance of the adnexa at subsequent surgeries was reported in 9 of 9 patients in the

laparoscopy group and in 4 of 5 patients in the laparotomy group. Four patients from the laparoscopy group and 2 from the laparotomy group underwent subsequent in vitro fertilization. In all 6 patients, oocytes retrieved from the previously detorsed ovary were fertilized. In both groups, none of the patients developed clinical signs of pelvic or systemic thromboembolism.

Conclusions: Torsion of the ischemic adnexa should be treated laparoscopically by detorsion and adnexal sparing.

Key Words: Twisted-ischemic adnexa, Laparoscopy, Laparotomy, Ovarian torsion.

INTRODUCTION

Torsion of the adnexa is a surgical emergency. Until recently, the common approach to the twisted ischemic adnexa was salpingo-oophorectomy.¹⁻⁸ Lately, it has been suggested that twisted adnexa, which have a viable macroscopic appearance, should be detorsed after palpation of the infundibulopelvic veins to rule out thrombi.^{2,3} Cystectomy at the same operation, or at a concurrent operation, is also advocated. Nichols and Julian⁴ recommend that detorsion be avoided out of concern regarding possible spread of thromboemboli from the infarcted adnexa to the circulation during the detorsion procedure.

Adnexal torsion occurs most often in adolescent girls and women of childbearing age.⁵ The majority of these patients desire future fertility. The advantages of ovarian preservation are apparent. For over 15 years, we have been routinely treating all twisted ischemic adnexa by detorsion and salvage of the adnexa.⁶ We first introduced this procedure in 25 patients at laparotomy.^{6,9-11} As we became more proficient at laparoscopic surgery, laparoscopic detorsion replaced laparotomy in our practice in all 67 concurrent cases of twisted ischemic adnexa.

The purpose of the current study was to examine our experience with conservative management of the twisted ischemic adnexa, in respect to preservation of ovarian function and fertility.

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METHODS

Between January 1984 and January 1998, black-bluish ischemic adnexa were encountered in 102 patients undergoing diagnostic laparotomy (35 patients) or laparoscopy (67 patients) due to signs and symptoms suggestive of adnexal torsion. Preoperative diagnosis of adnexal torsion was based on the patients' chief complaint of acute abdominal pain. The diagnosis was supported by pelvic examination and ultrasonography on admission, suggestive of a twisted adnexal mass, as described previously.⁷ No clinical or ultrasonographic signs of malignancy were demonstrated in any of the patients. Routine blood and urine analysis were normal in all patients, as was the coagulation profile performed preoperatively. The time interval from the appearance of symptoms suggestive of adnexal torsion until laparoscopy ranged from 2 hours to 144 hours, with a median of 16 hours. Six (5.8%) patients were previously diagnosed with polycystic ovary syndrome. Ten patients (9.8%) had a previous ovarian laparoscopic cystectomy. Twenty-six (25.5%) patients were pregnant on admission. Eighteen (64.3%) of the 28 pregnant patients had ovarian hyperstimulation syndrome following treatment with menotropins.

Regardless of the macroscopic ischemic appearance of the adnexa, except for 3 patients (all perimenopausal), none of the patients underwent oophorectomy or salpingo-oophorectomy. The duration of operation was not extended to allow observation for signs of reperfusion. Surgical procedures are listed in **Table 1**.

Short-term follow-up included a physical examination with special emphasis on early diagnosis of thromboembolic phenomena. Long-term follow-up was assessed in 2 stages. First, 6 weeks after discharge from the hospital, the patients underwent pelvic examination at the outpatient clinic. Transvaginal ultrasound scanning was performed to assess the size of both ovaries and to demonstrate follicular development.

Second, long-term evidence regarding the vitality of the detorsed ovary was collected. This included documentation of the macroscopic appearance of the untwisted adnexa if a subsequent incidental operation was performed, any additional ultrasonographic examinations, and report of fertility performance (spontaneous or assisted). Thus, the follow-up period ranged from 6 months to 14 years, with a median of 4 and 1/2 years.

Statistical Analysis

Statistical analysis included the 2-way nonpaired Student *t* test for continuous variables and the chi-square or Fisher's exact test for categorical factors. Statistical significance was set at $P < 0.05$.

RESULTS

Mean \pm SD adnexal size (ovary plus lesions) measured by transvaginal ultrasonography was 7.5 ± 3.11 vs 12.4 ± 2.8 cm in the laparoscopy and laparotomy groups, respectively ($P < 0.001$). Surgery revealed in all patients torsion of the adnexa with the gross macroscopic appearance of ischemia, engorgement, edema, black-bluish coloration, and distinct hemorrhagic foci. The median degree of torsion was 360° , with a range of 180° to 720° . Histological findings were available in 31 patients in whom cystectomy was performed (**Table 2**).

In patients who underwent laparoscopy, the mean hospital stay was 2.1 ± 1.2 vs 7.4 ± 1.5 days in the laparotomy group ($P < 0.001$). The main reason for the increased hospital stay was febrile morbidity in 10 (14.9%) patients in the laparoscopy group and 10 (28.6%) patients in the laparotomy group ($P < 0.1$).

None of the patients demonstrated clinical signs of pelvic or systemic thromboembolism.

Long-term follow-up was available for 60 (89.5%)

Table 1.
Surgical Procedures

	Detorsion Only	Detorsion and Cyst Aspiration	Detorsion and Cystectomy	Detorsion and Ovariopexy
Laparotomy	10	4	21	0
Laparoscopy	26	30	10	1
Total	36	34	31	1

patients in the laparoscopy group and 32 (91.4%) patients in the laparotomy group ($P<0.76$). Vaginal ultrasound revealed normal-sized ovaries with normal follicular development in 56 (93.3%) patients in the laparoscopy group and 29 (90.6%) patients in the laparotomy group ($P<0.93$) examined 6 weeks after discharge. No differences from the above were encountered on subsequent vaginal ultrasound examinations.

Five (4.9%) of the 102 patients had retorsion in the same adnexa within the follow-up period. All 5 patients demonstrated ultrasonographic follicular development postoperatively. In 13 of 14 (92.8%) patients who underwent subsequent incidental operations, normal macroscopic appearance of the previously detorsed ischemic adnexa was found. Six patients underwent in vitro fertilization. Oocytes retrieved from the previously detorsed ovaries were fertilized in all 6 patients.

DISCUSSION

This retrospective study clearly demonstrates that detorsion of twisted black-bluish ischemic adnexa can be easily accomplished by operative laparoscopy. Short-term follow-up revealed that laparoscopy is superior to laparotomy because it results in a lower rate of febrile

morbidity, reduced consumption of analgesic drugs, and a shorter hospital stay.

Two approaches were used to treat 102 patients, which is to the best of our knowledge the largest series reported thus far. None of the 102 patients had clinical signs of pelvic or systemic thromboembolism. This observation confirms the published data.¹²⁻¹⁵ Mage et al¹² state that they have never observed embolic complications after detorsion of twisted adnexa. Wagaman and Williams¹³ in a review of the literature could not find any cases of thrombotic embolus arising from the untwisting of twisted adnexa. Nichols and Julian⁴ quote the following, “If the vascular supply of the ovary or tube has become thrombosed, or the organ gangrenous, the organ should be excised without unwinding so that the chance of pulmonary embolism is lessened.” Nichols and Julian do not provide a reference for this statement. The assumption that detorsion of the adnexa is a hazardous procedure that exposes patients to the danger of thromboembolism was not supported in our study.

Preservation of ovarian function following a severe ischemic insult was demonstrated at similar rates in both groups (93.3% and 90.6% in the laparoscopy and laparotomy groups, respectively). This was proven by ultrason-

Table 2.
Histological Findings of Cystectomy During Detorsion

	Follicular	Corpus Luteum	Dermoid	Serous	Mucinous
Laparotomy	6	4	2	1	1
Laparoscopy	0	8	7	0	2
Total	6	12	9	1	3

Table 3.
Detorsion and Follow-up Literature Review

Author	No. of Patients	Laparotomy	Laparoscopy	Follow-up*
Levy ²¹	3	-	3	3/3
Mage ¹²	27	5	22	16/17
Shalev ²²	9	-	9	9/9
Cohen ^{6,9,10,11†}	102	35	67	85/92
Total	141	40	101	113/121 (93.4%)

*No cases of thromboembolism were reported.

†Including previous reports from our medical center.

ic demonstration of follicular development, by macroscopic appearance, and by fertilization of oocytes recovered from the untwisted ovary.

Several reports of ischemic-hemorrhagic adnexa treated by detorsion have been published (**Table 3**). Mage et al¹² divided their series of 35 patients according to the macroscopic appearance of the adnexa during surgery. Those having adnexa with a gangrenous appearance underwent oophorectomy. The others were treated by detorsion. They concluded that conservative management of mild and severe ischemic adnexa appears safe and effective. In all their 17 cases available for follow-up, preservation of ovarian function was observed. Oelsner et al⁶ reported salvage of the ovary in 35 of 37 cases. A total of 141 cases of treated twisted adnexa have been documented (**Table 3**). In 92 cases, long-term follow-up is provided. Of these 92 cases, salvage of the ovaries was demonstrated in 93.4%. We suggest, based on our experience with 102 patients, that even gangrenous-appearing adnexa should not be removed because it is not possible to estimate during surgery what the chances are for recuperation, and most patients with these adnexa do indeed recuperate. Furthermore, based on our short-term follow-up, we found that leaving the ischemic adnexa in tact after detorsion is not associated with a further risk of thromboembolism.

It is interesting that of the 7 patients in whom ovarian function was impaired postoperatively, 5 (71.4%) underwent ovarian cystectomy at the time of laparoscopy for detorsion. These observations lead us to recommend that cystectomy in the presence of an ischemic ovary should be avoided.

In our study, the average time delay from onset of symptoms to laparoscopy was 16 hours. The ability to retain viability despite prolonged ischemia was revealed by the good outcome in apparently severely injured ovaries. A possible explanation for this finding is that complete arterial obstruction usually does not occur, rather venous and lymphatic stasis are responsible for the ischemic-hemorrhagic appearance of the adnexa.

Color flow Doppler examination to differentiate between complete and incomplete obstruction of the blood supply to the twisted adnexa has been suggested.¹⁶⁻¹⁸ No consensus on the accuracy of this method has been reached.¹⁹ Another method of intraoperative assessment is intravenous injection of fluorescein reported in a group

of 11 patients.²⁰ In all our patients, we spared the adnexa, even those with a gangrenous appearance. We believe that these additional diagnostic procedures are not necessary, because they will not alter the clinical management of these patients.

We also recommend that during laparoscopy, only detorsion should be performed. During the study, we gained much experience, and today we try to avoid any additional surgery beyond detorsion, because handling of the edematous, friable, and ischemic adnexa is risky and may cause additional damage to the compromised adnexa. Careful manipulation of the adnexa is mandatory. We use only blunt-tipped graspers during laparoscopy. If the ovaries are hyperstimulated, cyst aspiration might be warranted before the detorsion procedure.

Our data strongly support the proposed new conservative approaches of adnexal-sparing to the management of the twisted-ischemic adnexa. We further recommend the laparoscopic approach over traditional salpingo-oophorectomy for the management of the twisted ischemic adnexa that should be completely avoided. In patients who desire fertility, all efforts must be made to preserve the adnexa.

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