



Clinical Characteristics and Management of Adnexal Torsion

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Authors' contributions

This work was carried out in collaboration between all authors. Author BTR designed the study. Authors BTR and SS wrote the first draft of the manuscript. Authors SO and SB revised the first draft. Authors SB and MN managed the literature search. Authors MT and AL analyzed and corrected the final version of the study. All authors read and approved the final manuscript.

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ABSTRACT

Adnexal torsion is a gynaecologic surgical emergency. Misdiagnosis or delay may lead to loss of the adnexa and may compromise fertility.

Aim: To determine the most relevant findings for the diagnosis of adnexal torsion and the results of laparoscopic surgery.

Methodology: A retrospective cohort study of 266 patients who underwent surgical treatment for adnexal torsion in our department from January 1994 to January 2014. Clinical, biological, ultrasonographic, therapeutic and histological findings were analysed as well as risk factors and prognosis.

Results: The mean age of patients was 33.1 years. Adnexal torsion occurred during pregnancy in 21 patients (7.8%). Abdominal pain was present in 91.7%, vomiting in 63.9% and fever in 19.1% of the cases. Ultrasonographic findings were: ovarian cysts (54.1%), complex mixed echogenicity masses (40.2%) and ovarian enlargement (5.6%). The pain-to-surgery interval varied from 4 hours to 26 hours. At surgery, the mean number of spiral turns was 2. Treatment was carried out by laparotomy in 87 patients (32.7%). The mean size of the adnexa treated by laparotomy was 10.7

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cm. Laparoscopic surgery was performed in 137 patients (51.5%). The mean size of the adnexa treated by laparoscopy was 6.9 cm. Laparoscopic treatment was conservative in 77.3% of the cases.

Conclusion: Adnexal torsion is a common gynaecologic emergency. Prompt diagnosis of adnexal torsion requires a combination of clinical, biological and sonographic investigation. The prognosis of adnexal torsion was potentially increased by the interval period before surgery. Laparoscopic treatment is the gold standard if possible.

Keywords: Ovarian torsion; ultrasonography; laparotomy; laparoscopy; prognosis.

1. INTRODUCTION

Adnexal torsion is defined as the twisting by at least one complete turn of the adnexa, the ovary, or more rarely the tube alone, around a centre-line consisting of the infundibulo-pelvic ligament and tubo-ovarian ligament [1]. In patients undergoing emergency surgery for acute pelvic pain, the frequency of adnexal torsion is about 2.5 to 7.4% [1]. It induces a massive congestion of the ovarian parenchyma, haemorrhagic infarction, followed by gangrene and haemorrhagic necrosis [1-3]. Adnexal torsion is usually encountered in women of childbearing age but can also occur in childhood and in the postmenopausal period [1-3]. Torsion occurs in either tumoral or even in normal adnexa. Diagnosis is based on clinical examination and ultrasonography. It must be suspected as early as possible in order to prevent irreversible damage of the adnexal structures, thus, allowing conservative, ovary-sparing treatment especially in young women. Diagnosis and treatment of this gynaecological emergency benefited from advances in laparoscopic surgery.

2. MATERIALS AND METHODS

A retrospective cohort study of all patients who underwent surgery for adnexal torsion in the department of obstetrics and gynecology in Charles Nicolle university hospital from 1st January 1994 to 1st January 2014 is reported. Epidemiological data, ultrasound findings, surgical and histo-pathological findings were studied. Surgical treatment was carried out either by laparotomy or by laparoscopy. All patients have been informed of the possible risks of radical treatment before surgery and their signed consent was obtained. The first step was to confirm the diagnosis and to specify which organs (tube, ovary or both) were involved in the torsion as well as the number of turns. The second step was to untwist the adnexa and to assess the potential for recovery of the tissues in a mild saline solution. The last step was to treat

the aetiology of the torsion. Any suspicion of malignancy during the diagnostic part of the laparoscopy, required conversion to laparotomy.

3. RESULTS

Two hundred and sixty six patients underwent surgery for adnexal torsion during the 20-year study period. The mean age was 33.1 years (range: 14–91). 221 patients (83%) were aged under 40 years. 251 patients (93.9%) were of child-bearing age. Fifteen patients (5.6%) were post-menopausal. The mean parity was 0.9 (range 0-8). 139 patients were nullipara (52.2%). 64 patients (24%) had risk factors for ovarian torsion: A history of ovarian cysts (12.4%), a past history of ovarian torsion (1.5%), tubal ligation (3.7%) and polycystic ovarian syndrome (6.3%). 21 patients (7.8%) were pregnant at the time of ovarian torsion, the mean age of pregnancy was 10.4 weeks (range: 6-23). All pregnancies were conceived spontaneously. One patient presented in the 30th day of the post partum.

The main clinical features included: acute pelvic pain in 244 patients (91.7%), nausea or vomiting (63.9%), fever (19.1%). A palpable pelvic mass was found in 50.7% of the cases. Leukocytosis was noted in 99 patients (37.2%). Ultrasound scans were performed in all patients. The mean size of the adnexa was 7.7 cm (range 3-16 cm). Ultrasound findings included: Ovarian cysts (54.1%), complex mixed echogenicity mass (40.2%), enlarged ovary (5.6%), intraperitoneal fluid (8.2%). Doppler investigation of the adnexa was performed in only 20 cases and was normal in all cases. The pain-to-surgery interval varied from 4 hours to 26 hours.

At surgery, the mean number of spiral turns was 2.1 (range 1-5). The right adnexa were involved in 60.1% of the cases. In one case, the torsion was bilateral. Treatment was carried out by laparoscopy in 137 cases (51.5%) and by laparotomy in 129 patients (48.4%): Including a

conversion from laparoscopy to laparotomy in 14 patients (2.2%). Treatment was conservative for the adnexa in 188 patients (70.6%) and radical in 78 patients (29.3%). A more conservative attitude was decided for patients having had surgery after the year 2000 even if the adnexa seemed to be necrotic.

The mean size of the adnexa treated by laparotomy was 10.3 cm (range 5-15 cm). The indications of laparotomy were as follows: A suspicion of an ovarian cancer, a gestational age greater than 14 weeks, a size of the adnexal mass greater than 12 cm and an important haemoperitoneum. Treatment by laparotomy was radical in 47 patients (36.4%). In 20 cases Salpingo-oophorectomy was decided because the adnexa were necrotic in 20 cases and in case of ovarian malignancy suspicion in 7 cases. For one of these seven patients, histopathology confirmed a borderline tumor of the ovary. In the remaining 20 patients treated by laparotomy, bilateral salpingo-oophorectomy was performed because the patients were peri or post menopausal.

Laparoscopic surgery was performed in 137 patients (51.5%). The mean size of the adnexa treated by laparoscopy was 6.9 cm (range 3-12 cm). Laparoscopic treatment was radical in 31 patients (11.6%). Salpingo-oophorectomy was carried out because the adnexa were necrotic in 18 cases and in peri or post menopausal patients in 10 cases. Salpingectomy was performed in 3 cases: Two patients had a twisted hydrosalpinx and one patient had a fissured and twisted extra-uterine pregnancy. Laparoscopic treatment was conservative in 106 patients (77.3%) and consisted mainly in the detorsion of the adnexa followed by intraperitoneal cystectomy.

An ovariopexy was performed in 3 patients (out of 4) in case of recurrence.

Histopathology was studied in all cases. No normal structure could be recognized by the histo-pathological examination in 6.3% of cases because of total necrosis. Benign lesions were largely predominant (99%). In only one case, the histo-pathological findings concluded to a borderline tumor of the ovary. Ovarian cysts were the most frequent lesions, found in 96.9% of the cases. Adnexal torsion occurred on normal adnexa in 6 cases (2.2%) having either an enlarged utero-ovarian ligament or in case of polycystic ovarian syndrome (PCOS) with

enlarged ovaries. The histo-pathological findings are represented in Table 1.

Table 1. Histopathological findings

Histopathology	N	%
Dermoid cysts	78	29.3
Serous cysts	62	23.3
Para-ovarian cysts	40	15.03
Functional ovarian cysts	45	16.9
Mucinous cysts	8	3
Fibro-thecomas	3	1.1
Endometriomas	3	1.1
Ectopic pregnancy	1	0.3
Hydrosalpinx	2	0.7
Borderline tumor	1	0.3
Necrosis/no normal structures	17	6.3
Normal adnexa/enlarged ovary	6	2.2
Total	266	100

No per-operative complications were observed and the post-operative course was uneventful. The hospital stay after laparoscopy was shorter than that after laparotomy: 2.4 days (range 2-5) and 5.1 days (range 3-7) respectively. No retorsion happened after conservative treatment in our series. Finally, 21 patients were pregnant at surgery. Two of them underwent laparoscopy and the other patients underwent laparotomy. One patient had a miscarriage one week after radical treatment at 8 weeks of gestation, whereas, the other patients, had perfectly normal pregnancies with term delivery.

4. DISCUSSION

Adnexal torsion mainly occurs in young, genitally active women; 15% of the cases are reported in childhood and 15% of the cases are reported after menopause [3]. 52% of our patients were nullipara at the time of diagnosis. This frequency is similar to that reported in the literature (55.6%) [1-4]. The clinical features of ovarian torsion are variable and non specific [1,4-6]. Ovarian torsion should be suspected in any patient presenting with abdominal pain especially when she has recognized risk factor for ovarian torsion. These risk factors include conditions such as previous abdominal surgery, a history of ovarian torsion, a history of ovarian cysts, ovarian hyperstimulation syndrome and polycystic ovaries as well as concomitant pregnancy, pelvic infection and a history of tubal ligation [1-3]. In this series, 24% of the patients had a recognized risk factor. This is a relatively low percentage compared with other series [1,2,7-10]. The proportion of adnexal

torsion occurring during pregnancy varies from 18 to 28.7% in literature [1,4,11]. The torsion risk in patients with a known adnexal mass during pregnancy is estimated to be 0.7% [1,2,11,12]. Moreover, the clinical presentation is poor and non specific during pregnancy explaining the difficulties of diagnosis.

A review of literature shows that there is no reliable method enabling the diagnosis of adnexal torsion to be confirmed pre-operatively [1,5,12,13]. Indeed, its diagnosis is very inefficient with 23–66% of cases correctly diagnosed prior to surgery [1,2,11,12]. A latero-uterine mass may be found in 41–70% of cases during clinical examination. Ultrasound diagnosis of ovarian torsion is not specific despite the advances in ultrasonography [1,6-8]. The combination of sonographic imaging with Doppler in acute pain situations may be a helpful tool for diagnosis of adnexal torsion [6,7]. The absence of Doppler is not observed in all cases and is a late finding. The persistence of normal Doppler flow in proved torsion may be due to the dual blood supply of the ovary and to intermittent or partial torsion [13].

Time from presentation to diagnosis in this study varied from 4 to 26 hours. This is comparable to other series that report a median time of 30 hours [3,11,12,14,15]. The noted predominance of right adnexal involvement (60.1%) was consistent with data reported in the literature [16,17]. Not only torsion occurs in pathological adnexa but also it may involve healthy ones [8,10,17]. Ovarian cysts are the most frequent implicated lesions in adnexal torsions. They are reported up to 60 to 90% in literature [1,8,15,17]. Commonly the cysts reported are benign mainly dermoid cysts that represent 20 to 60% of the cases whereas malignant tumors represent 1 to 2% of the cases [3,4,11,18]. When the adnexa is otherwise healthy, malformation or excessive length of the utero-ovarian ligament may be responsible [1,5].

Time between the onset of pain and surgery is a crucial factor. The shorter it is, the better the prognosis is [1,3,4,6,7,16]. Pain lasting more than 10 hours before surgery is associated with an increased rate of adnexal necrosis [1,16].

Laparoscopy is actually the preferred technique for the management of adnexal torsion [1,2,7,14]. Compared to laparotomy, it offers a reduced post operative course, fewer thromboembolic complications, less postoperative pain and a

lower cost [10,12,17-19]. A conversion rate to laparotomy is reported in 5.2% of the cases in our series. These findings are similar to those reported by different authors such as Chen, Mage and Morice [10,17,18]. These authors insist on the possibility of performing the treatment by laparoscopy [3,10,17-19]. Furthermore, they stress on the possibility of conservative treatment by laparoscopy reported up to 90% in some series. They recommend that ovarian salvage must be attempted even if adnexal torsion seems to be severe [9,12,17,20,21]. The decision of performing adnexectomy was sometimes problematic because the initial macroscopic aspect of the adnexa could not be assessed easily. A recent study by Jung, suggests some CT scan predictors, especially tubal thickening, for selecting conservative surgery or adnexectomy in case of adnexal torsion [22]. The benefit expected from conservative treatment is the resumption of endocrine and follicular ovarian functions [8,17,21,23]. Shalev [24] reported that 73% of patients desiring pregnancy became pregnant within 12 months after the conservative laparoscopic treatment of adnexal torsion. Cohen [25] reported a laparoscopic conservative treatment of non malignant adnexa in young patients desiring pregnancy in 93.1% of the cases, including those having an ischemic appearance. Despite such encouraging results ovarian salvage rates remain low. Salvage rates in literature vary from 7 to 65% of the cases [5,12,20,21]. Prevention of retorsion theoretically should be possible by performing an ipsilateral oophorepexy. The indications suggested in literature are malformation or excessive length of the utero-ovarian ligament, a torsion of a solitary adnexa and in cases of recurrent torsion [26]. Finally, the postoperative course was uneventful in our series, especially there were no thromboembolic complications after detorsion. A review of literature shows less post operative complications after laparoscopy [1,10,14,15,27].

5. CONCLUSION

Ovarian torsion is a common gynaecologic emergency. Prompt diagnosis of adnexal torsion remains difficult and requires a combination of clinical, biological and sonographic investigation. Advances in ultrasonography and the use of Doppler technology improved the diagnostic sensitivity. Surgery confirms the diagnosis and allows the management approach. Laparoscopy is preferred to explore the abdominal cavity, to perform the untwisting of the adnexa and to treat

the cause. The Surgical treatment performed depends on how early the diagnosis has been made, to the surgeon's experience, to the age of the patient and to the histological nature of the lesions responsible for adnexal torsion. This study shows a relatively high ovarian salvage rates compared with most published data, however, further improvement in salvage rates may be obtained by earlier diagnosis.

ETHICAL APPROVAL

All authors hereby confirm that protection of privacy, and other human rights were respected. Authors confirm that they have obtained all necessary ethical approval from local Committee. They also confirm that this study is not against the public interest and that the release of information is allowed by legislation.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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