Surgical treatment outcomes of serious chronic tubo-ovarian abscess: a single-center series of 20 cases

K. Nakayama[1], M. Ishikawa[1], H. Katagiri[1], A. Katagiri[1], T. Ishibashi[1], K. Iida[1], N. Nakayama[2], K. Miyazaki[1]

[1]Departments of Obstetrics and Gynecology, [2]Department of Biochemistry, Shimane University School of Medicine, Izumo (Japan)

Summary

In recent years, Shimane University Hospital has begun to see patients with pelvic inflammatory disease (PID) which has become severe and chronic after insufficient conservative treatment in primary or secondary medical care facilities. Serious chronic tubo-ovarian abscess (TOA) is complicated by intraperitoneal inflammatory adhesions to surrounding organs, so that it is difficult to determine the original anatomical position of organs at surgery. Forcible synechotomy can result in damage to the adhering organs and insufficient drainage after surgery can cause recurrence of inflammation. In order to increase the chances for a successful surgical treatment, careful preparation, such as preoperative administration of antibiotics and ureteral stent insertion are necessary. In addition, the chances for recurrence of inflammation can be lessened by thorough intraperitoneal irrigation and insertion of a drainage tube.

Key words: Pelvic inflammatory disease; Tubo-ovarian abscess.

Introduction

Thanks to the recent development of effective antibiotics, most cases of pelvic inflammatory disease (PID) are being cured by conservative management. The careless use of antibiotics, however, sometimes causes recurrence of infection resulting in serious chronic tubo-ovarian abscess (TOA), in which the prognosis is extremely poor. TOA is the consequence of extensive suppurative infection and is often resistant to treatment. Once the severity is advanced, conservative care is no longer effective and surgical treatment is required [1, 2].

Empirical knowledge tells us that emergency surgery for PID without adequate preparation cannot achieve a good result due to serious adhesions and friability of the pelvic organs; the patient often ends up with a recurrence of infection. It is becoming clear that pelvic inflammation should be controlled by using strong antibiotics and prepare for surgery by placing ureteral stents, then proceed with surgical treatment for a higher curative rate.

Materials and Methods

Treatment outcomes of serious chronic TOA patients requiring operations in Shimane University Hospital from November 2006 through November 2011 were analyzed: the patients' medical background, pathogenic bacteria, medical records, and operative reports were reviewed. The validity of the treatment policy for TOA was then examined.

Of the 20 serious chronic TOA cases which required surgical treatment, 17 cases (85.0%) originally received conservative treatment at private clinics. When their disease was not controlled, they were admitted to Shimane University Hospital.

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Patients' background

Table 1 summarizes the patients' background. The average age was 47.4 years (33-80). Pregnancy history: nulliparous two cases (10%), parous 18 cases (90%). Married: 19 cases (95%), menopause: four cases (20%), infertility: five cases (25%), usage of intrauterine device (IUD): two cases (10%), past history of pelvic operation: 11 cases (55%), past history of PID: four cases (20%).

Findings at diagnosis

Table 2 summarizes the findings at diagnosis. Almost all patients (14/20, 70%) presented with a palpable mass at diagnosis. Pelvic peritonitis was present in 85% of all cases (19/20). Patients with TOA showed high serum white blood cell count (WBC) and C-reactive protein (CRP) levels on laboratory examination. The average diameter of the masses was 74.7 mm (18-180). Computed tomography (CT) and magnetic resonance imaging (MRI) showed that 55% (11/20) of patients had an adnexal abscess accompanied by ovarian tumors. In those cases, 60% (12/20) occurred in the right ovary; 40% (8/20) of cases were complicated by endometriosis.

Pathogenic bacteria

The detection rate was 30% (6/20) in cultures from the ovarian mass and 35.0% (7/20) in cultures from the cervical duct. The gram-negative bacilli of aerobic bacteria were the most frequently detected, while the pathogenic bacteria in most cases were anaerobic. New quinolone-resistant bacteria were seen in some cases, but the rate of chlamydia IgG detection was unexpectedly low (15.0%, 3/20).

Use of antibiotics and other drugs

Most of the TOA patients in this study had already received antibiotic treatment, so it was not possible to standardize the antibiotic treatment from the start. In general, typical salpingitis is controlled by β-lactam derivatives while more powerful antibiotics, such as fourth generation cephalosporins and carbapenems, are used for TOA. In this study, all patients were treated with these powerful antibiotics, with new quinolones or amino-

glycosides used concurrently for 44.1% of patients. In addition, 50% (10/20) of the patients were treated with immunoglobulin preparations.

Results

Table 3 summarizes the treatment results. The average length of hospital stay was 22.3 (9-54) days. Patients were required to stay an average of 4.9 (0-19) days in the hospital before surgery and 17.7 (7-49) days afterwards.

The average operation time was 215 minutes, longer than that of conventional total abdominal hysterectomy and salpingo-oophorectomy. The average blood loss was 910 ml, a relatively large quantity for an operation for benign disease. Postoperative laboratory examination showed average hemoglobin levels of 9.0 g/dl (5.4-11.6). Fifty percent (10/20) of patients required intraoperative blood transfusion. Abscess drainage alone, salpingo-oophorectomy, and total hysterectomy + salpingo-oophorectomy were performed for 5% (1/20), 30% (6/20), and 65% (13/20) of patients, respectively.

All nine patients who required bilateral salpingo-oophorectomy and were older than 45 years, showing extended inflammation to their uterus, received total hysterectomy + bilateral salpingo-oophorectomy in order to prevent the recurrence of inflammation. Fifteen percent (3/20) of patients required intestinal tract resection due to severe adhesions.

There has been one recurrent case in the past five years. That patient received only abscess drainage due to poor surgical conditions: the operation was performed in an emergency situation and because of the extensive inflammation, it was impossible to determine the anatomical relationship of the organs for proper surgical treatment. Several days after her surgery, CRP increased again and CT showed reformation of the abscess. The authors placed ureteral stents and then performed a radical operation. Since this experience, ureteral stenting as preoperative management has been the standard, when possible. Use of ureteral stenting in this series was 65% (13/20). Joint surgery with gastrointestinal surgeons was required in 65% (13/20) of patients who needed a radical operation. Postoperative drainage was provided in 90% (18/20) of patients. It took 5.6 days on average, ranging from two to nine days, until drainage became no longer necessary. Patients with intestinal adhesions required longer periods of drainage.

Since September 2008, the authors have been performing thorough pelvic and peritoneal irrigation with a large quantity of physiological salt solution for prevention of abscess recurrence. They have followed this protocol with over 5,000 ml of solution for 14 (70%) patients in this series and with 5,000-10,000 ml solution for 11 (55%) patients. Since commencing this irrigation protocol, the authors have not experienced a single recurrence.

Table 1. — *Patient chracteristics.*

Mean age	47.4 (33-80)
Married	19/20 (95%)
History of gravidity, parity	18/20 (90%)
Menopausal status	4/20 (20%)
Previous pelvic sugery	11/20 (55%)
History of PID	4/20 (20%)
Use of IUD	2/20 (10%)
Previous infertility	5/20 (25%)

Table 2. — *Clinical and laboratory data.*

Palpable mass	14/20 (70.0%)
Pelvic peritonitis	19/20 (85.0%)
Mass diameter on sonography	74.7 (18 - 180)
Mean body temperature (°C)	38.7°C (37.0 - 39.8°C)
Mean WBC/ml	15,622 (10,930 - 27,600)

Table 3. — *Treatment results.*

Duration of period in hospital (days)	22.3 (9-54)
Operation time (min)	215 (59-368)
Blood loss (ml)	910 (10-2150)
Use of ureteral stent	13/20 (65.0%)
Operation with digestive surgeons	13/20 (65%)
Positive culture from the cervix	7/20 (35%)
Antibiotic treatment in hospital (I.V.)	
Single agent, %	12/20 (60.0%)
Multiple agents, %	8/20 (40.0%)

Discussion

In general, women with a history of childbirth show a higher incidence of pelvic abscess, compared with nulliparous women [3]. IUD usage is considered to be one of the causes of TOA. In this study, most patients had a history of childbirth. The number of women who used an IUD, however, was unexpectedly low. Half of the patients had a history of pelvic surgery, such as ovarian resection and appendectomy, and one-third had a past history of PID. It became clear that parous women and those with a history of pelvic surgery or PID tended to suffer from TOA at a higher frequency than women without this history. In addition, since 40% of the patients had endometriosis; this could constitute a predisposition for infection [4]. One of the reasons TOA occurs more frequently on the right side may be the anatomical positioning of other organs which could cause infection, such as in the appendix. When TOA is caused by IUD insertion, the pathogenic bacteria can be actinomyces [5]. In most cases of TOA, actinomyces are identified in the operative specimens [6].

The origins of TOA may vary. Some infections may originate from the cervix or endometrium and ascend through the fallopian tubes, some spread hematogenously from the uterus or through the lymphatic system, and some occur as a consequence of abdominal infection, such as appendicitis or diverticulitis. There are several causes that predispose to TOA: 1) Examination or treatment of the uterine cavity such as IUD placement, uterosalpingography, hysteroscopy, dilatation and curettage, and embryo transfer; 2) Transvaginal treatments such as tamponade, artificial fertiliza-

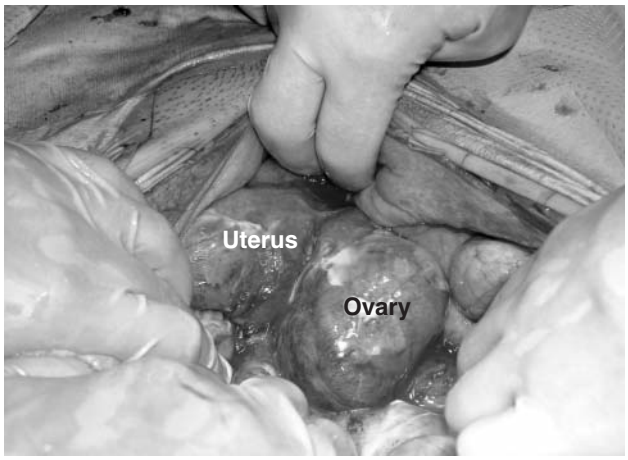

Figure 1. — Intraoperative findings of severe chronic TOA. The ovaries, uterus, and intestinal tract have become firmly adhesed.

tion, and ovum collection; 3) Sexually-transmitted infections (STI) (chlamydia, etc.); 4) Pyometra; 5) Pelvic surgery (radical hysterectomy, etc.); 6) Cesarean section [7]. Chlamydia is supposed to play a large part in causing TOA [4], but it was not detected in any of the patients in this study.

While uncomplicated salpingitis can be cured by second-generation β-lactam derivatives, some infections may develop resistance to these antibiotics and advance to serious chronic TOA due to resistant bacteria. These cases should be treated with strong antibiotics, such as carbapenems, in order to control the inflammation resulting from infection. Ideally, appropriate antibiotics should be administrated as soon as pathogenic bacteria are identified by culture. Only then, if appropriate antibiotics do not control the infection should surgical treatment be undertaken [7, 8]. Identification of the pathogenic bacteria is essential for determining antibiotic treatment; however, in most clinical situations, empiric therapy is begun without waiting for the result of bacteriologic cultures.

Shimane University Hospital is a tertiary care facility; most cases of TOA evaluated in this hospital had acquired drug resistance to initial conservative treatment given by previous clinicians, progressing to serious chronic TOA. The operations for these patients were quite difficult due to severe adhesion formation. Incorrect use of antibiotics (inappropriate antibiotic choice, incorrect duration of treatment, etc.) during conservative care might cause PID or TOA to progress to serious chronic TOA. Making a prompt decision to treat serious chronic TOA surgically is vital for curative resection [9].

In the present facility, surgical treatment was preceded by several days of antibiotic treatment to avoid long hospitalization. No cases showed evidence of recurrence of inflammation, and the average hospitalization period was 17.7 days (7-49). Surgery for serious chronic TOA is often challenging for the gynecologist because severe inflammatory adhesions are present, and the operation often requires support from a general surgeon, gastrointestinal surgeon, or urologist (Figure 1). The authors sometimes encounter cases in which operative techniques common to surgeries for gynecologic malignancies are needed due to severe adhesions to surrounding organs and the possibility of organ injury [8].

In one study, 8.4% of 71 TOA cases in which total hysterectomy plus adnexectomy was performed were accompanied by intestinal injury [8]. This report advises that ureteral stenting is useful for performing the operation safely. In addition, it should be mentioned that the friability of inflammatory tissue causes unexpected bleeding and intestinal edema. Securing central venous access is essential. Finally, postoperative infection is another complication that should be carefully monitored. There are two kinds of infection resulting from surgery: surgical site infection (SSI) and peritoneal infection.

When the operation is clean (vs clean-contaminated, contaminated, or dirty), the incidence of SSI is below two percent. SSI increases to 40% in cases involving infectious diseases [10]. Careful observation is imperative in the postoperative period. Fever, change of skin color, and emergence of pain can be signs of postoperative infection. The main cause of SSI is thought to be bacterial contamination during the operation by the irrigation fluid from the abdominal cavity or subcutaneous tissue. Indigenous bacteria on the patient's skin or leakage of bacteria from the gastrointestinal lumen can enable contamination during the operation [11-13]. Other reports have claimed that patients' decreased immunity after prolonged surgery and blood transfusion were capable of causing SSI as well [13-15].

In order to avoid SSI, bacterial contamination should be strictly prevented during surgery. In the present study, the authors found that copious irrigation of the abdominal cavity could reduce the incidence of SSI, yet some studies report it could lead to SSI. The authors did not find this a causal relationship between irrigation and SSI. The incidence of SSI is reported to be nearly 0% for upper gastrointestinal surgery. In contrast, 27% of lower intestinal surgical cases are complicated by SSI [14, 16, 17]. What can be learned from these reports is that careful observation of the surgical site is very important for TOA operations, especially when lower intestinal resection is performed. In addition, an abscess can be formed at the vaginal cuff or within the pelvic cavity. Since phlegmonous inflammation involving the vaginal cuff is usually accompanied by unbearable pain, careful attention should be paid to patients' complaints.

In the case of TOA, inflammation is expected to spread nearly to the pelvic wall, so antibiotics with a broad spectrum, effective for gram-positive, gram-negative, and anaerobic bacteria, should be used from the beginning [7, 9]. The reason for postoperative abscess recurrence in the abdominal and pelvic cavities is thought to be insufficient drainage, caused by unhygienic operative technique or hematoma formation [10]. When continuous fever or abdominal pain emerge after surgery for serious chronic TOA, the possibility of abscess recurrence should be immediately considered and imaging studies such as CT scanning carried out.

Conclusions

Although PID can seem to be cured by oral antibiotics, it sometimes recurs and becomes chronic. Initial treatment for PID should be addressed with extreme prudence; once PID advances to TOA, radical surgery is often required. Strong broad-spectrum antibiotic treatment while awaiting surgery can facilitate adhesiotomy during the operation; this is preferable to an emergency operation without adequate preparation. A pelvic abscess tends to involve the urinary tract when it expands. Ureteral stenting can be useful to protect the urinary tract. Finally, thorough irrigation of the abdominal cavity at the end of the operation and inserting a drainage tube after concluding the surgery are important to prevent abscess recurrence and wound infection.

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Address reprint requests to:
K. NAKAYAMA, M.D.
Shimane University School of Medicine
Enyacho 89-1
Izumo, Shimane (Japan) 6938501
e-mail: kn88@med.shimane-u.ac.jp