Effectiveness of Laparoscopic Surgery Against Antibiotics-resistant Pelvic Inflammatory Disease

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Key words: Antibiotics-resistant PID, Elevated WBC and CRP serum levels, Laparoscopic surgery

ABSTRACT

Objective: To describe the effectiveness of laparoscopic surgery in 5 cases of antibiotics-resistant PID.
Design: Retrospective study.
Setting: Department of Gynecology and Obstetrics at Hokusetsu General Hospital
Patients: Five of 28 hospitalized women diagnosed with PID between Jan 1999 and 2003. Included criteria were elevated WBC and CRP serum levels associated with severe tenderness of the uterus and adnexa as observed by internal examination.
Intervention: Laparoscopic operation was performed on 5 cases in which conservative therapy was not effective, following administration of antibiotics for no less than 3 days or when a focus of disease was confirmed by scanning or MRI.
Main Outcome Measures: Causative organism, indication of operation and daily serum levels of WBC and CRP
Results: The number of Chlamydia-positive patients was 9/28 (32.1%) and Gram-positive bacillus was identified in 15 (53.5%) patients by cultures obtained from the secretions of the vagina and cervix. Twenty-one patients made recoveries using antibiotics alone, with their serum levels of WBC and CRP declining to normal levels. Laparoscopy was performed on 6 patients who were resistant to conservative therapy and had an apparent focus of disease. The patients receiving laparoscopy made a recovery after having the focus removed and drained, and their serum levels of WBC and CRP then also declined quickly. All operative and postoperative courses were uneventful and no anesthesia-induced side effects were identified.
Conclusion: Laparoscopic surgery could be safe and useful for diagnosis as well as surgical treatment for antibiotics-resistant PID in which apparent focus of disease is detected.

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INTRODUCTION

Pelvic inflammatory disease (PID) is an inflammation and infection of the upper genital tract in women, typically involving the fallopian tubes, ovaries, and surrounding structure. The accurate diagnosis of PID is difficult because PID is diagnosed based on the clinical judgment of the gynecologist [1]. Therefore, there has been some hesitation to adopt laparoscopy for diagnosis and treatment of PID in Japan. However, laparoscopic surgery has recently been reported as an effective treatment for PID. In this study we retrospectively evaluated PID cases from the past 4 years to determine the effectiveness of laparoscopic surgery against antibiotics-resistant PID.

PATIENTS and METHODS

Sixty five patients were diagnosed as PID in outpatient clinic and of which 28 hospitalized women for further treatment at Osaka Medical College were retrospectively studied. Included criteria were; elevated WBC and CRP serum levels associated with abdominal direct tenderness, tenderness with motion of cervix [2], and uterus and adnexal tenderness. All patients were treated with broad-spectrum antibiotics including ofloxacin, metronidazole, doxycycline, ceftriaxone and cefoxitan, [3] and the effect was evaluated by examination of symptoms, WBC counts and CRP level [2]. CT or MRI was carried out in cases in which conservative treatment was thought to be ineffective. Laparoscopic operation was performed following the case in which antibiotics administration for about 3 days were thought to be ineffective or case that showed an apparent focus of disease in CT or MRI regardless of conservative therapy.

RESULTS

Table 1 shows patients profile which revealed the number of inflammation of adnexa was highest followed by PID, uterine endometritis and pyometra (Table.1). Of which 20% (13/65) and 30.2% were positive for Staphylococcus epidermidis and Chlamydia respectively (Table.2). Twenty-eight patients were admitted with hospital following

<table>
<thead>
<tr>
<th>Table 1 Patients profile (Mean ±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
</tr>
<tr>
<td>No. of unmarried</td>
</tr>
<tr>
<td>No. of married</td>
</tr>
<tr>
<td>Clinical diagnosis</td>
</tr>
<tr>
<td>No. of inflammation of adnexa</td>
</tr>
<tr>
<td>No. of pelvic peritonitis</td>
</tr>
<tr>
<td>No. of uterine endometritis</td>
</tr>
<tr>
<td>No. of pyometra</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2 Patient profiles (some patientswith multiple infection)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture of vagina and cervix</td>
</tr>
<tr>
<td>Gram-positive bacillus</td>
</tr>
<tr>
<td>Gram-positive coccus</td>
</tr>
<tr>
<td>Staphylococcus epidermidis</td>
</tr>
<tr>
<td>group B streptococcus</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>Gram-positive coccus</td>
</tr>
<tr>
<td>Gonococcus</td>
</tr>
<tr>
<td>Gram-negative bacillus</td>
</tr>
<tr>
<td>E. coli</td>
</tr>
<tr>
<td>Chlamydia PCR positive</td>
</tr>
<tr>
<td>negative</td>
</tr>
</tbody>
</table>
medication, which was confirmed as ineffective in outpatient clinic. Laparoscopic operation was performed in five cases following no less than 3 days medication which didn’t show improvement symptom and laboratory data. Table 3 shows characteristics of 6 patients who undertook laparoscopic surgery (Table.3). Figure 1 shows time-course of WBC count of operated 6 cases.

**Case I**

The patient visited the outpatient clinic of internal medicine with chief complaint of aggravated lower abdominal pain. Pain was complicated with fever of 37.8°C and a pregnancy test was positive. The patient was referred to the gynecology unit for further examination and dilatation and curettage (D&C). CRP was elevated, exceeding 11 mg/dl and USG showed a small amount of ascites. Pain could not be controlled by antibiotics and ectopic pregnancy was suspected, therefore laparoscopic surgery was performed. Greenish pus was identified at the cul-de-sac. Left ovary was swollen to 3 cm diameter like lutein cyst without torsion and only filmy adhesion of right fallopian tube was. The

**Table 3 Patients profile of operated 6 cases**

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Obstetric history</th>
<th>Drug, x administered days</th>
<th>Days until operation</th>
<th>WBC (x10^9)</th>
<th>CRP</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>36</td>
<td>G1P1A0</td>
<td>CPR x8</td>
<td>9</td>
<td>129</td>
<td>16.6</td>
<td>Adhesiotomy, Drainage</td>
</tr>
<tr>
<td>II</td>
<td>46</td>
<td>G2P2A0</td>
<td>MINO x3, FMOX x3, PAPM x7</td>
<td>20</td>
<td>158</td>
<td>29</td>
<td>Adhesiotomy, Drainage</td>
</tr>
<tr>
<td>III</td>
<td>25</td>
<td>G2P1A0</td>
<td>MINO x6, BIPM x6</td>
<td>1</td>
<td>126</td>
<td>8.6</td>
<td>Adhesiotomy, D&amp;C</td>
</tr>
<tr>
<td>IV</td>
<td>33</td>
<td>G3P2A0</td>
<td>FMOX x3</td>
<td>10</td>
<td>52</td>
<td>2.8</td>
<td>Adhesiotomy, Cystectomy</td>
</tr>
<tr>
<td>V</td>
<td>40</td>
<td>G3P3A0</td>
<td>FMOX x3</td>
<td>15</td>
<td>60</td>
<td>6.0</td>
<td>Adhesiotomy, Drainage</td>
</tr>
<tr>
<td>VI</td>
<td>31</td>
<td>G0P0A0</td>
<td>FMOX x3, AMK x3</td>
<td>3</td>
<td>250</td>
<td>33.9</td>
<td>Adhesiotomy, Drainage</td>
</tr>
</tbody>
</table>

*Fig. 1 Time-course of WBC count of 6 cases.*
appendix was normal and there was no severe adhesion. Adhesiolysis and cystectomy were performed followed by drainage. CRP and WBC level normalized shortly after operation.

Case II

The patient visited a nearby clinic with a chief complaint of lower abdominal pain and was administered antibiotics, however pain was aggravated, and 8 days later, the patient was referred to the internal medicine department of our hospital. Acute appendicitis was suspected and an operation was undertaken, followed by antibiotics administration, patient was discharged. A few days after leaving hospital, the pain recurred and the patient was readmitted, however, the pain worsened and body temperature rose to 38.3°C in spite of 3 days medication, then laparoscopy was carried out. The presence of severe filmy adhesion was identified in the cul-de-sac, uterus and bilateral adnexa. Following blunt and sharp dissection, pelvic lavage of 2000ml saline and drainage were performed and appendix showed no abnormal findings. Symptoms and laboratory data improved in a few days after laparoscopic surgery.

Case III

The patient visited a nearby clinic complaining of lower abdominal pain and was administered oral antibiotics for 3 days, however, they were not effective. The patient was referred to our hospital. PID was suspected and antibiotics were given intravenously. The pain and fever-up of upper 38°C didn’t improve, and 3 days later, USG showed small amounts of ascites and a lutein cyst. During laparoscopy, adhesiolysis for the filmy adhesion, pelvic lavage and removal of lutein cyst were performed. Symptoms and laboratory data improved quickly following operation.

Case IV

The patient visited the outpatient clinic of internal medicine with a chief complaint of lower abdominal pain following 3 days of antibiotics administration, CRP remained elevated exceeding 10 mg/dl with fever-up of 38.1°C. The patient was referred to the gynecology unit for further examination. USG showed 4.3cm-abscess in the cul-de-sac. Laparoscopy revealed filmy adhesion, therefore adhesiolysis was performed followed by peritoneal lavage. CRP and WBC counts went down shortly after operation.

Case V

The patient was referred to the gynecology unit for further examination of pelvic pain. CRP was elevated, exceeding 2 mg/dl, therefore the patient was prescribed with 3 days of antibiotics at the outpatient clinic and came home. USG and MRI showed no apparent abnormal findings, however, the symptoms and fever-up of 37.5°C remained in spite of antibiotics administration. Laparoscopy was carried out to rule out the appendicitis, then, adhesiectomy and drainage were performed for the filmy adhesion. (Fig.2). Postoperative course was uneventful and the patient was discharged from hospital 7 days later.

Case VI

The patient visited the gynecology unit complaining of persistent pelvic pain in spite of 3 days of antibiotics administration. WBC and CRP were 25000 and 33.9, respectively at the time of initial visit. Patient was admitted to the hospital and antibiotics were administered intravenously.

CT showed apparent pelvic abscess and the symptoms and elevated serum WBC remained in spite of antibiotics administration, therefore laparoscopic surgery was carried out (Fig.3). Adhesiectomy, infusion and absorption were done and drain was left in the pelvis (Fig.4). This case was complicated with severe endometriosis, therefore, second look laparoscopy (SL) was done following GnRHα treatment. Pelvic findings in SL were much better than first one and adhesiectomy and cystectomy were easily completed (Fig.5).

DISCUSSION

PID is one of the most serious complications of sexually transmitted diseases and a leading cause of reproductive ill health in women [2]. Clinical criteria for the diagnosis of PID, such as the presence of lower abdominal pain, bilateral adnexal tenderness, fever, and increased erythrocyte sedimentation rate, have poor sensitivity and specificity as demonstrated by laparoscopic studies [4]. Regardless of enormous medical and public health implications, the clinical diagnosis of PID by clinical measures alone, even under the best of circumstances, has a low rate of accuracy [5]. Lower abdominal pain plus two or more symptoms such as and signs or adnexal tenderness, and cervical motion tenderness, are widely supported diagnostic criteria for PID without basis [6]. Empirical treatment for PID should not be disregarded because once women suffer PID, 20% of them become in-
Fig. 2
1: The presence of severe filmy adhesion was identified in the cul-de-sac, uterus and bilateral adnexa.
2: Blunt and sharp dissection was carried out.
3: Cul-de-sac was made free followed by pelvic lavage of 2000ml saline.
4: Drainage was performed by placing drain in the pelvis.

Fig. 3 CT showed apparent pelvic abscess

Fig. 4
1: The presence of severe adhesion made finding uterus and bilateral ovary quite difficult.
2: Abscess was confirmed by aspiration.
3: Adhesiotomy was performed as much as possible.
4: Drainage was performed by placing drain in the pelvis.
Fertile and 2% of them are prone to ectopic pregnancy [7, 8], therefore accurate diagnosis is necessary to maintain future fertility. There is insufficient evidence to support existing diagnostic criteria, therefore a new evidence base to confirm diagnosis of PID is urgently needed. However, this will require either a new investigation of association between clinical presentation and PID based on a laparoscopic gold standard, or the development of new diagnostic techniques [5]. The relationship between CRP levels and PID is not known, however Goldstein reported that CRP levels increased in only 18% - 27% of patients with acute PID. The cause of pain was not clear for the remaining 73% - 82%, but it may have been related to adhesions and chronic inflammation.

The previously accepted belief that surgical intervention during acute pelvic infection would result in greater injury than waiting for the infection to subside began with a New York City study by Simpson, suggesting that early surgery is associated with increased technical difficulty [9]. Varghese noted that drainage may require surgical exploration, however, percutaneous drainage guided by imaging studies (ultrasound or computed tomography) should be used as an initial option if possible [10]. However, in 1969, Jacobson suggested routine laparoscopy fulfills all the demands of highly accurate, safe simple, and time saving diagnostic procedure in PID, however many believe that diagnostic laparoscopy may be uneconomic and troublesome in cases of suspected PID due to psychosocial variables and cost-effectiveness [11]. The advantages of laparoscopic diagnosis of PID include an immediate and accurate diagnosis that leads to the most appropriate management of the problem, and the ability to obtain culture specimens from the fallopian tubes or abscess, laparoscopic drainage of purulent material, lavage of the pelvis and lysis of adhesions, which may hasten recovery [8]. However, laparoscopy has its own morbidity when performed by inexperienced clinicians, therefore it is still controversial whether laparoscopy should be the first choice for diagnosis and treatment of PID [12].

Morcos reported that laparoscopy should be performed on PID cases in which significant improvement did not occur within 48 hours of antibiotic therapy and the diagnosis of PID should be laparoscopically established. The lack of precision in clinical diagnosis was evaluated by Chaparro et al, who diagnosed salpingitis via laparoscopy in 46% of patients who were not believed clinically to have PID [13]. The accuracy of laparoscopically established diagnosis when pathology is visualized should be almost 100%. The procedure frequently confirms the diagnosis and provides the necessary access for surgical treatment. Prompt and effective management prevents the complications that are associated with delayed treatment and often preserves the patient’s fertility [14]. Diagnostic accuracy as well as therapeutic capabilities of laparoscopy prevents unnecessary laparotomy, which is a more invasive approach for patient [15]. Laparoscopy offers the gynecologist 100% accuracy in diagnosis while simultaneously accomplishing definitive treatment with a low rate of complications [16, 17]. Moreover, rapid intervention of laparoscopy resulted in shorter hospital stays and faster recovery. It is possible that we have not been aggressive enough in performing laparoscopic surgery on patients with PID due to the success of modern antibiotics against PID and fear of laparoscopic injury. However, antibiotics therapy alone is often insufficient treatment because the bacterial content of the abscess is high and antibiotics concentration low [18]. In our cases, laparoscopy was carried out only in the cases in which significant
effectiveness of antibiotics was not secured and apparent focus of infection was confirmed by USG or MRl. Based on all of this evidence, we should consider prompt laparoscopy as an alternative to treat and confirm diagnosis of PID cases in which future fertility must be maintained. Complications such as superficial or deep wound infection, wound dehiscence, bowel injury including delayed perforation secondary to unrecognized injury, and bowel obstruction did not occur in these cases.

In conclusion, further study might be necessary to evaluate the effectiveness of laparoscopic intervention in PID. Although we studied only 6 cases of antibiotics-resistant PID, laparoscopy proved to be an efficient tool in diagnosis and treatment of PID in those cases.

REFERENCES


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