ABSTRACT

Objectives: We sought to define the role of laparoscopy in identifying the clinical significance, cause, and association between adhesions and chronic pelvic pain.

Methods: A retrospective chart review was conducted from October 2004 to July 2005, at the Kiel School of Gynecological Endoscopy, University Hospitals Schleswig-Holstein, Campus Kiel, Germany. Included in the study was the analysis of 462 laparoscopic procedures; 275 (59.5%) of the patients undergoing these procedures had pelvic or abdominal adhesions. Of these, 84 (30.5%) patients were admitted with the main complaint of chronic pelvic pain. Further evaluation and assessment of this group was carried out.

Results: Among those patients with adhesions, the second most frequent reason for admission was chronic pelvic pain (30.5%) (P<0.0005). In our study, adhesions were found in 79.2% (n=84) of patients (n=106) with chronic pelvic pain. These adhesions were thin-filmy (19.0%) or thick-fibrous (81.0%) adhesions containing blood vessels. Thick-fibrous adhesions were present in 50.0% of patients at multiple abdominopelvic sites (P<0.005).

Conclusions: Thick-fibrous adhesions that extend beyond the pelvic sidewall can cause significant chronic abdominopelvic pain.

Key Words: Adhesions, Adhesiolysis, Pelvic pain, Laparoscopy.

INTRODUCTION

The incidence of intraperitoneal adhesions in patients after general abdominal or gynecological surgery ranges from 63% to 97%.

Although the majority of patients remain asymptomatic, a considerable number experience serious complications, including bowel obstruction, female secondary infertility, and reoperative complications. The presence of adhesions from previous surgery significantly increases the length of time required in subsequent surgical procedures, adversely affecting the workloads of surgical teams.

Certain surgical procedures carry a greater risk of adhesion-related complications. Surgical procedures on the ovary and fallopian tubes have been shown to result in the highest risk of adhesion-related readmission (48.1% and 41.2% of women readmitted, respectively). For laparoscopic myomectomy, this increases to 41 in every 100 procedures.

In one study, the number of adhesion-related readmissions increased steadily over a 10-year period, with 16% occurring within the first year after the initial surgical procedure. Some studies have also shown that adhesion-related complications can occur 10 years after the initial surgical procedure.

More than two thirds of cases of small bowel obstruction are adhesion related. Moreover, approximately 40% of chronic pelvic pain cases are related to adhesions, and 56% of repeat surgery is potentially complicated by adhesions. Fertility related complications are also common, with 15% to 20% of secondary infertility in women being adhesion related.

Nevertheless, one of the most challenging problems facing the gynecologist is the patient with chronic pelvic pain. It accounts for 10% of office visits to gynecologists. Laparoscopy is a valuable tool in the evaluation of undiagnosed chronic pelvic pain. It is also extremely valuable in confirming the presence of adhesions that cannot be revealed sonographically. The following study is an attempt to understand the clinical significance and cause behind chronic pelvic pain.
METHODS

A retrospective chart review was conducted from October 2004 to July 2005 at the Kiel School of Gynecological Endoscopy, Germany. All patients (n=462) who were admitted for diagnostic (n=156, 33.8%) or operative laparoscopy (n=306, 66.2%) were included in this study. The data were collected from hospital records and patient charts. The operative senior consultant had documented all operative reports. The operative reports were reviewed thoroughly. For data accuracy, all records were input into the computer and checked twice by 2 senior analysts.

The patients were categorized according to the reason for admission, which included ovarian surgery, pelvic pain, uterine myomectomy, infertility, tubal surgery, and laparoscopic hysterectomy. Any other gynecological or surgical procedure was included in the “other surgical procedures” group.

The main procedures performed were documented as were the previous history of infertility and past surgical history. Patients with previous surgical history were classified into 3 groups. The first group included patients who had previous surgery in an interval of 0 year to 5 years and the other 2 groups, 5 years to 10 years and >10 years, respectively.

The presence of adhesions was documented. According to their nature, the adhesions were classified as thin-filmy or thick-fibrous containing blood vessels. Furthermore, the sites of the adhesions were classified according to their presence in the upper abdomen, mid abdomen, pelvis, or at multiple sites. The presence of endometriosis and operative complications was also documented.

A senior consultant had carried out all procedures. Patients who were suspected of having adhesions or pelvic pain were managed carefully, and Palmer’s point was selected as an intraperitoneal entry site by using a 5 mm trocar.

Statistics

The data were analyzed using the SPSS statistical computer program. Comparisons between groups were performed with Pearson chi-square tests. Two-tailed tests were used, and P<0.05 was considered statistically significant.

RESULTS

Of the 462 patients, 275 (59.5%) were identified as having pelvic or abdominal adhesions (Table 1, Figure 1). The main reason for hospital admission in this group of patients was the need to undergo ovarian surgery (34.2%), but this was not statistically significant. However, the second most frequent reason for admission in patients with pelvic pain was the necessity for a diagnostic laparoscopic procedure (30.5%), which was statistically significant (P<0.0005). Other reasons for admission were the necessity for laparoscopic uterine myomectomy (13.5%), diagnostic laparoscopy for infertility (10.5%), tubal surgery (6.2%), laparoscopic hysterectomy (3.3%), and other gynecological or surgical procedures (1.8%).

Regarding the type and site of adhesions, 37.5% of patients were identified as having thin-filmy adhesions (37.9% in the upper abdominal region, 8.7% in the mid abdominal region, 27.2% in the pelvic region, and 26.2%...
at multiple sites) (Figure 2). Thick-fibrous adhesions containing blood vessels were found in 62.5% of patients (19.2% in the upper abdominal region, 5.8% in the mid abdominal region, 14.5% in the pelvic region, and 60.5% at multiple sites, P < 0.0005) (Figure 2).

Of the 275 patients, only 193 (70.2%) had a previous surgical history, and 35.8% of these had more than one previous surgery. The other patients had a previous history of one operative procedure, which included appendectomy (26.9%), uterine myomectomy (7.8%), diagnostic laparoscopy (6.7%), ovarian surgery (5.7%), tubal ligation (3.6%), hysterectomy (2.6%), ectopic pregnancy (2.1%), and other surgical procedures (8.8%) (Table 2).

Previous surgery was carried out in 15.5% of patients during an interval of 0 year to 5 years, in 10.9% of patients during an interval of 5 years to 10 years, and in 73.6% during an interval of more than 10 years. Moreover, the incidence of adhesions was statistically significant in patients with more than one previous surgery, one of them at least during an interval of more than 10 years (29.0%) (P < 0.0005). Of the 275 patients, only 59 (21.5%) were identified as having coexisting endometriosis. A history of primary infertility and secondary infertility was found in 49 (17.8%) and 9 (3.3%) patients, respectively. All 275 patients had intraoperative adhesiolysis; however, only one patient (0.4%) had extensive bleeding.

Further analysis of the patients who were admitted with a history of chronic pelvic pain [n = 106 (22.9%)] revealed that only 84 (79.2%) had adhesions (Table 1). Of this subgroup, 19.0% had thin-filmy adhesions: 6.0% in the upper abdominal region, 2.4% in the mid abdominal region, 8.3% in the pelvic region, and 2.4% at multiple sites. Thick-fibrous adhesions containing blood vessels were found in 81% of patients: 9.5% in the upper abdominal region, 3.5% in the mid abdominal region, 17.9% in the pelvic region, and 50.0% at multiple sites (which is statistically significant P < 0.005) (Figure 3).

In regard to the relation between timing and type of previous surgery among patients with chronic pelvic pain, the highest incidence of adhesions was found in patients with more than one previous surgery, one of them at least during an interval of more than 10 years (37.3%); however, this is not statistically significant (Table 3).

Finally, only 18 (16.9%) patients were identified as having coexisting endometriosis.

**DISCUSSION**

Postoperative adhesions form after virtually every transperitoneal operation, ranging from minimal scarring, present on serosal surface, to dense agglutination of nearly all structures. The most common laparoscopic findings in patients with and without pelvic pain were endometriosis and adhesions. Nevertheless, immunohistologic studies have shown evidence of nerve fibers in adhesions that had been removed from patients with and without pelvic pain. However, in one study in which laparoscopy was used to evaluate 100 women who consistently reported pelvic pain in the same location for a minimum of 6 months, adhesions were the most common pathology, accounting for 38%. In our study, adhesions were found in 79.2% of patients with chronic pelvic pain. Moreover, the presence of adhesions with coexisting chronic pelvic pain was the second most frequent reason for admission to our hospital (30.5%, P < 0.0005) (Table 1).

To accurately describe the extent of peritoneal adhesions during clinical investigations, various scoring systems have been developed. Systematic assessment of adhesions is mandatory to decrease intraobserver variation and to provide quantitative data corresponding to their extent and clinical significance. Most scoring systems incorporate adhesion location, vascularity, and type (thickness). Unfortunately, none of the current scoring systems in use...
has been validated, so that the interpretation of research related to adhesion formation and prevention is difficult. Thus, a study that demonstrates a significant change in an adhesion score may not reflect a true clinical difference in the extent of adhesive disease.

Approximately 20% to 50% of patients with chronic pain have pelvic adhesions. Adhesions that restrict the free movement of pelvic organs have been implicated as a cause of chronic pelvic pain. Although no quantitative relationship has been established between the extent of adhesions and the presence or severity of pain, one study review noted an association between the location of adhesions and the location of pelvic pain. We found in our study that 50% (P<0.005) of patients with chronic pelvic pain and coexisting adhesions had thick-fibrous adhesions at multiple abdominal and pelvic sites (Figure 3).

Lysis of adhesions has been proposed as the therapeutic modality of choice, and some investigators report the resolution of chronic pain in individuals after lysis of adhesions, whereas others have not noted this effect consistently. It is better to prevent adhesions from forming in the first place than to treat adhesions once they have occurred. A range of strategies is available to minimize the risk of adhesion formation, including gentle tissue handling, meticulous hemostasis, minimally invasive surgery, constant irrigation, and minimal foreign body contact. However, data from some studies indicate that such strategies have had little impact to date. Nevertheless, several promising new antiadhesion products are either available or in development. Available clinical data show encouraging results. In patients with chronic pelvic pain and adhesions, in addition to adhesiolysis, if an antiadhesion agent is safe and cost effective, then its routine use should be supported during surgery, particularly during high-risk procedures.

**CONCLUSION**

Adhesions can cause significant abdominopelvic pain, especially if they are thick-fibrous and extend beyond the pelvic sidewall. However, adhesions are not always a
source of pain in women with chronic pelvic pain and adhesions. Furthermore, future studies should focus on the clinical use of antiadhesion agents in the prevention of postsurgical adhesion formation.

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Table 3.

Relation Between Timing and Type of Previous Surgeries in Patients With Pelvic Pain

| Surgical History          | Time Interval of Previous Surgery | Total |
|---------------------------|----------------------------------|-------|
|                           | 1-5 yrs  | 5-10 yrs | > 10 yrs | |
| >One Previous Surgery     |          |          |          | 33 (49.3%) |
| Appendectomy               | 7 (10.4%)| 1 (1.5%) | 25 (37.3%)|
| Myomectomy                 | 2 (3.0%) | 0 (0.0%) | 9 (13.4%) | 11 (16.4%) |
| Tubal Ligation             | 1 (1.5%) | 1 (1.5%) | 3 (4.5%)  | 5 (7.5%)  |
| Diagnostic Laparoscopy     | 1 (1.5%) | 0 (0.0%) | 2 (3.0%)  | 3 (4.5%)  |
| Ovarian Surgery            | 1 (1.5%) | 0 (0.0%) | 1 (1.5%)  | 2 (3.0%)  |
| Hysterectomy               | 1 (1.5%) | 0 (0.0%) | 0 (0.0%)  | 1 (1.5%)  |
| Other Surgical Procedures  | 0 (0.0%) | 1 (1.5%) | 6 (9.0%)  | 7 (10.4%) |
| Total                      | 15 (22.4%)| 4 (6.0%) | 48 (71.6%)| 67 (100%) |
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