



## Awareness and perception of intra-abdominal adhesions and related consequences: survey of gynaecologists in German hospitals

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### ABSTRACT

**Objective:** Intra-abdominal adhesion formation after abdominal surgery is the most common postsurgical complication, and the consequences are a considerable burden for patients, surgeons and health systems. Since a wide variety of factors influence adhesion formation, it is difficult to define clear guidelines on how to reduce adhesion formation in daily practice. Given this dilemma, this study assessed the awareness and perception of adhesion formation among gynaecologists in Germany in order to define a baseline for further research and education.

**Study design:** The Clinical Adhesion Research and Evaluation (CARE) group of the University of Giessen designed a questionnaire that was sent to the heads of all gynaecological departments in Germany. The director or one of the surgical consultants was asked to complete the questionnaire and return it for evaluation.

**Results:** The completed questionnaire was returned by 279 of 833 gynaecological departments. Interviewed surgeons expected adhesions to form in 15% of cases after laparoscopy and 40% after laparotomy. Before surgery, 83.1% of the respondents told their patients about the risk of prior adhesion formation. More than 60% believed that postsurgical adhesion accounts for major morbidity. Infections within the abdomen, previous surgery and extensive tissue trauma were thought to have the most influence on adhesion formation. Risk of adhesion formation was thought to be highest in endometriosis and adhesiolysis surgery. The respondents agreed on performing adhesiolysis in symptomatic but not in all patients. Only 38.4% used adhesion reduction agents regularly. A total of 65.1% of a repertoire of adhesion prevention agents were familiar to the interviewed surgeons. Only 22.0% of them used anti-adhesion products in clinical practice. In general, the respondents were uncertain whether these products play an important role in adhesion reduction, represented by a range of  $1.97 \pm 0.98\%$  on a scale from 0 to 4.

**Conclusions:** Even though postoperative adhesions are recognized as a major cause for morbidity, and it is widely agreed that infections, extensive tissue trauma and surgery lead to adhesion formation, there is uncertainty about the treatment and prophylactic strategies for dealing with adhesions. This dilemma reflects the awareness and perception of gynaecologists in Germany and is an initial point for further research.

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### 1. Introduction

Intra-abdominal adhesions account for the highest number of postsurgical complications and may represent one of the greatest unsolved problems in medicine today. Epidemiological studies describe postoperative adhesion formation in 50–100% of surgical

patients [1]. They are responsible for 65–75% of small bowel obstructions that could be life threatening and require subsequent surgical intervention [1–5]. In addition, 15–20% of female infertility is caused by intra-abdominal adhesions and the most common morphological changes seen in women with chronic abdominal pain are pelvic adhesions [6,7]. Therefore, intra-abdominal adhesions have a severe impact on the quality of life of many patients. Nevertheless, the social and healthcare system-associated impacts as well as the increasing burden of medicolegal claims linked to intraperitoneal adhesions are often

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underestimated and many surgeons are still not aware of the extent of this problem. To assess German gynaecologists' current awareness and perceptions of intra-abdominal adhesion formation and reduction strategies, we performed a postal questionnaire. Based on the results of this study, a future educational concept can be developed to improve the adhesion awareness of German gynaecologists.

After peritoneal injury the pathogenesis of adhesions is complex and comprises a wide variety of factors and cofactors from wound healing processes, which comprise inflammatory responses and fibrinolysis. Since early publications over 100 years ago, a variety of factors influencing mesothelial healing and adhesion formation have been discussed and identified (e.g. foreign bodies, tissue trauma) [8–11]. Although it is impossible to prevent adhesions, their formation can be reduced with good surgical practice to minimize tissue trauma and placement of foreign materials in the peritoneal cavity [12]. In recent years, the armamentarium of commercially available anti-adhesion products has increased. Though the scientific results of in vitro studies are promising, the regular use of these agents in clinical practice is mostly uncommon and healthcare providers do not refund the cost of anti-adhesion products. Furthermore, difficulties in defining adhesions, and the absence of an international intra-abdominal adhesion classification, mean that studies on adhesion reduction lack an objective, comparative aspect. On behalf of the European Society for Gynaecological Endoscopy (ESGE), a consensus paper has been published to guide gynaecologists in "state of the art" handling of adhesions and to fulfill their duty of patient care [11].

In order to assess the awareness of gynaecologists in Germany about adhesion formation and its associated consequences, the APLLE questionnaire was designed and sent to all Departments of Gynaecology in Germany. The resulting data give an overview of the actual knowledge of German gynaecologists concerning the pathogenesis of adhesion formation as well as their attempts to reduce adhesion formation in their daily surgical practice. In addition, this study should serve as a fundamental basis for further research on this topic.

## 2. Materials and methods

The Clinical Adhesion Research and Evaluation Group in Giessen designed the Adhesion Prophylaxis in Laparoscopic and Laparotomic surgery (APLLE) questionnaire (Appendix 1). This questionnaire contains six questions on hospital data and nine questions with further subdivisions on the topic of adhesion formation and adhesion reduction. Besides asking for comments and an estimate of the occurrence of adhesions, the answers were based on a five-point Likert scale. The questionnaire was tested for intelligibility on 10 volunteers.

Between May and July 2008 the questionnaire was mailed to every gynaecological hospital department in Germany and the head of the department was asked to complete the questionnaire either personally or by delegating the task to one of his surgical consultants and to return it. From August onwards, the hospitals were contacted via telephone and reminded about the questionnaire, which was re-faxed if necessary. Since this questionnaire does not deal with specific patient data, the ethics committee was not involved. After three months the evaluation ended.

Data from the faxed or mailed questionnaires were evaluated with SPSS software 15.0 for Windows. A *p*-value of <0.05 was considered significant.

## 3. Results

The questionnaire was sent to all 833 gynaecological departments within hospitals in Germany. The return rate was 33.5% (279/833). The characteristics of the clinics are shown in Table 1.

Adhesions were believed to develop more often after laparotomy 39.2% ± 22.3 compared to laparoscopy 18.6% ± 17.0.

Sixty percent of the respondents thought that they had high or very high levels of expert knowledge in the diagnostics of adhesions before surgery (162/270). High or very high levels of expert knowledge during surgical therapy were reported by 89.8% (246/274); 46.5% (127/273) reported similar levels of knowledge about adhesion prevention strategies. A total of 49.5% (135/273) of the respondents had little or indifferent experience in adhesion

**Table 1**

Percentage and number of returned questionnaires per hospital type, and summary of the number of staff (D: director, C: consultant, and R: resident), number of surgeries in 2007 and number of hospital beds.

| Hospitals ( <i>n</i> ) | Returned questionnaires % ( <i>n</i> ) | Staff number: ( <i>n</i> ) |   |   | Number of surgeries 2007: ( <i>n</i> )<br>laparotomy<br>laparoscopy<br>vaginal surgery<br>ambulatory | Number of beds <i>n</i> ± SD (min, max) |
|------------------------|----------------------------------------|----------------------------|---|---|------------------------------------------------------------------------------------------------------|-----------------------------------------|
|                        |                                        | D                          | C | R |                                                                                                      |                                         |
| Private hospital       | 22.9 (38/166)                          | 2.6 ± 0.9                  |   |   | 181.7 ± 203                                                                                          | 20.5 ± 11.9 (5, 65)                     |
|                        |                                        | 0.5 ± 0.5                  |   |   | 152.9 ± 267.7                                                                                        |                                         |
|                        |                                        | 1.1 ± 1.3                  |   |   | 95.2 ± 90.8                                                                                          |                                         |
|                        |                                        |                            |   |   | 228.9 ± 196.4                                                                                        |                                         |
| Day clinic             | 33.3 (12/40)                           | 3.7 ± 3.1                  |   |   | 103.0 ± 298.7                                                                                        | 24.3 ± 22.6 (10, 65)                    |
|                        |                                        | 0.3 ± 0.6                  |   |   | 1123.4 ± 1266.0                                                                                      |                                         |
|                        |                                        | 0.3 ± 0.6                  |   |   | 631.3 ± 929.7                                                                                        |                                         |
|                        |                                        |                            |   |   | 2681.3 ± 3209                                                                                        |                                         |
| Urban clinic           | 36.6 (140/383)                         | 1.1 ± 0.3                  |   |   | 313.1 ± 173.6                                                                                        | 39.2 ± 14.1 (15, 89)                    |
|                        |                                        | 2.4 ± 1.0                  |   |   | 316.5 ± 294.4                                                                                        |                                         |
|                        |                                        | 6.0 ± 2.4                  |   |   | 241.6 ± 211.8                                                                                        |                                         |
|                        |                                        |                            |   |   | 383.7 ± 225.7                                                                                        |                                         |
| Municipal clinic       | 36.2 (76/210)                          | 1.1 ± 0.4                  |   |   | 556.9 ± 254.2                                                                                        | 56.3 ± 16.2 (26, 101)                   |
|                        |                                        | 3.9 ± 1.4                  |   |   | 386.3 ± 238.9                                                                                        |                                         |
|                        |                                        | 8.6 ± 2.4                  |   |   | 342.5 ± 282.3                                                                                        |                                         |
|                        |                                        |                            |   |   | 564.7 ± 302.4                                                                                        |                                         |
| University clinic      | 38.2 (13/34)                           | 1.0 ± 0                    |   |   | 792.4 ± 348.9                                                                                        | 74.4 ± 23.1 (48, 100)                   |
|                        |                                        | 8.2 ± 2.5                  |   |   | 578.3 ± 296.0                                                                                        |                                         |
|                        |                                        | 18.4 ± 7.4                 |   |   | 398.0 ± 334.7                                                                                        |                                         |
|                        |                                        |                            |   |   | 690.4 ± 350.2                                                                                        |                                         |

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