



# Implications of late complications from adhesions for preoperative informed consent

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## DECLARATIONS

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**Summary** The process of informed consent is a critical aspect of the doctor–patient relationship. Doctors have a professional duty to provide patients with sufficient information if a treatment is associated with a significant risk. NHS guidelines advise doctors to mention risks that occur more frequently than 1–2% or risks that are serious even if the likelihood is very small. In the case of abdominal and pelvic surgery, risks can broadly be divided into early and late complications. Early complications, such as bleeding and infection, have a close temporal relationship with the operation. Such complications are routinely mentioned during the consent process. In contrast, postoperative adhesions cause changes in the normal anatomy that can adversely affect function many years and even decades after the original operation, leaving patients at lifelong risk for late complications. These late adhesive complications, namely bowel obstruction, mechanical female infertility and chronic pain, are often neglected during the consent process. However, the risks to patients from late adhesive complications are serious and well in excess of the accepted threshold where it could be considered a breach in the duty of care not to inform patients. This is reflected by a number of claims against the NHS based on consent issues regarding late adhesive complications of surgery. Therefore, late complications of surgery from adhesions should be included in the pre-operative consent process. This would decrease litigation costs but more importantly also underpins the doctor–patient relationship.

## Introduction

The process of informed consent is a critical aspect of the doctor–patient relationship. Doctors have a professional duty to provide patients with sufficient information if a treatment is associated with a significant risk. Early risks of surgery, such as bleeding and infection, are dreaded by surgeons and patients alike. These risks are routinely mentioned during the consent process. In contrast, complications from surgical adhesions rarely

cause perioperative problems. Consequently, surgeons and patients may have a false sense of security. However, adhesions cause changes in the normal abdominal anatomy that can adversely affect function many years and even decades after the original operation. Postoperative patients are at lifelong risk for such late complications and their risk compounds over time. Here we discuss the implications of such late complications from adhesions for the preoperative informed consent process.

**Table 1**  
Quantitative risk of adhesive bowel obstruction following common surgical procedures

Procedure	Evaluated postoperative timeframe (years)	Frequency (%)
Laparotomy <sup>1,3,6-8</sup>	1-5	1-7
Appendectomy <sup>7,45-48</sup>	4-30	1-10
Open cholecystectomy <sup>45</sup>	5	6
Intestinal surgery <sup>7,8,49,50</sup>	2-10	9-25
Restorative proctocolectomy <sup>7,51-54</sup>	5-10	17-25

### Late complications from postoperative adhesions are frequent and serious

Postoperative adhesions are connective tissue bands that form between adjacent tissues following abdominal operations. Due to this change in the normal anatomy, affected patients are at risk for subsequent late complications from the original operation, namely adhesive bowel obstruction, female mechanical infertility and chronic pain syndromes. Any subsequent surgical procedures are also complicated by the presence of adhesions. Adhesion-related complications are common. The total number of patients presenting with these late complications has been estimated at 9% within the first year after abdominal surgery, rising to 19% by 4 years, and 35% by 10 years.<sup>1,2</sup> Furthermore, complications continue to compound over time, averaging 2.1 readmissions over 10 years for patients experiencing problems.<sup>1</sup> There is limited published data beyond 10-year follow-up, yet clinical experience shows that adhesive small bowel obstruction may occur more than 50 years following an operation.<sup>3</sup>

Of the various adhesion-related complications, small bowel obstruction has been studied in the greatest detail. Postoperative adhesions represent the commonest cause of intestinal obstruction in the Western world, accounting for 40% of all cases and 60-70% of those involving the small intestine.<sup>3</sup> This surgical emergency has a mortality rate of 3-10% for simple obstruction,<sup>3-5</sup> escalating to 30% when the bowel becomes necrotic or perforated.<sup>3</sup> Follow-up studies of patients undergoing laparotomy have demonstrated that 1-7% developed adhesive obstruction within the first 5 years

after surgery.<sup>1,3,6-8</sup> The published frequency of adhesive obstruction after other common surgical procedures are summarized in Table 1. However, the total burden on patients may be far greater than what the published data suggest, as the risk of adhesive obstruction continues for life. Consequently, the implications for paediatric patients are of particular concern. For children under 16 years of age who undergo abdominal surgery, the re-admission rate for small bowel obstruction attributable to adhesions within the first 5 years was estimated at 5% if appendectomy was excluded, and 1% if appendectomy was included.<sup>8</sup> For children under 5 years of age, the readmission rate directly attributable to adhesions was 4% within 4 years after abdominal surgery, with a readmission rate possibly attributable to adhesions of 16%.<sup>9</sup> These numbers are alarming because the tolerance of children for conservative management is lower than adults, leading to frequent and earlier surgical management. One study concluded that 44% of children presenting with adhesive small bowel obstruction had immediate surgical management.<sup>10</sup> Together these data demonstrate that adhesive bowel obstruction is a serious and frequent problem that occurs many years to decades after surgery.

Moreover, adhesions are the leading cause of secondary female infertility. Postoperative adhesions are thought to cause infertility in 15-20% of women and it has been estimated that 20-40% of secondary female infertility is caused by adhesions.<sup>11-13</sup> Thus, it was shown that term pregnancy rates correlate with adhesion scores<sup>14-16</sup> and that adhesiolysis in infertile women with adhesions significantly increases pregnancy rates in comparison to untreated women.<sup>17</sup> The pathophysiological basis of this causal relationship is the anatomical distortion of the normal adnexal anatomy by adhesive bands, which interferes with fertilization of the ovum and transport of the embryo.<sup>18,19</sup>

The role of adhesions in chronic pelvic pain is more controversial. On the one hand, there is clear evidence that adhesions contain sensory nerve fibres.<sup>20</sup> Furthermore, traction on the highly sensitive visceral and parietal peritoneum, which can result from adhesive changes of the abdominal anatomy, causes pain. This has been demonstrated by conscious laparoscopic pain mapping studies.<sup>21,22</sup> In particular, filmy adhesions between

**Table 2****Optimal surgical technique to reduce adhesion formation**

1. Microsurgical technique to minimize surgical trauma, which triggers adhesion formation<sup>55</sup>
2. Minimize bleeding and use meticulous irrigation to limit fibrin deposition<sup>56</sup>
3. Do not leave behind devascularized or ischaemic tissue<sup>57</sup>
4. Choose fine, non-reactive sutures<sup>58</sup>
5. Minimize dessication of tissues and limit the use of dry sponges<sup>59</sup>
6. Avoid powdered gloves<sup>60</sup>
7. Reduce pressure and duration of the pneumoperitoneum during laparoscopic surgery<sup>61</sup>

a movable structure such as an ovary and the peritoneum cause high pain scores, whereas dense and immobile adhesions cause little pain.<sup>23</sup> On the other hand, retrospective analysis of patients undergoing diagnostic laparoscopy for chronic pelvic pain or infertility did not reveal significant differences in the incidence, density or location of adhesions between these patient populations.<sup>24</sup> Furthermore, a meta-analysis showed no long-term benefit of adhesiolysis in improving pelvic pain except when adhesion scores were high.<sup>25</sup> However, this finding might be explained by recurrence of the adhesions after surgical adhesiolysis. Therefore, the evidence for a role of adhesions in postoperative chronic pain is ambiguous.

Finally, adhesions also complicate any subsequent surgical procedures due to adhesive changes of the normal anatomy. These changes include the obliteration of dissection planes and attachment of organs that are usually separate. This is reflected in significantly increased operating times<sup>26,27</sup> and increased complication rates in these patients. Re-operative laparotomy carries a 19% risk of inadvertent enterotomy if adhesions are present<sup>28,29</sup> and there is a 10–25% risk of bowel injury in laparoscopic adhesiolysis.<sup>30</sup>

In summary, late complications from postoperative adhesions are serious and occur frequently. They pose a significant risk to patients.

### **Late complications from adhesions are not given sufficient emphasis during preoperative consent**

Surgeons have a professional duty to give sufficient information to patients where a significant

risk has been established. In practice, early complications that are likely to occur more than 1% of the time are usually mentioned.<sup>31</sup> In contrast, expert opinion indicates that late adhesive complications are commonly neglected during the consent process for surgery.<sup>7,8,29,32–35</sup> This has been confirmed by surveys among surgeons,<sup>36</sup> patients<sup>37</sup> and a retrospective review of consent forms.<sup>38</sup> There appears to be a stoic attitude with regards to adhesions that has been compared to the attitude of surgeons towards wound infection before the contributions of Joseph Lister.<sup>39</sup> However, the evidence discussed above indicates that late complications from postoperative adhesions are serious and occur frequently. Surgeons can also take active steps to minimize adhesion formation. These steps include meticulous technique (Table 2) and the application of adhesion barriers<sup>40,41</sup> in young patients and high-risk cases. In all of these aspects, late complications from adhesions are comparable to early complications that are routinely mentioned during preoperative consent. Therefore, practice must change and the inclusion of late adhesive complications in the consent process is in order.

### **Legal implications of late complications from adhesions**

Surgeons who neglect to mention adhesive complications during preoperative consent may be vulnerable to litigation. In order to establish negligence, a claimant has to demonstrate that: first, there is a duty of care; second, that a breach in the duty of care has occurred; and third, that this breach caused the injury. All three aspects need to be present in order to constitute negligence. While the Bolam test had long been used in determining duty of care, recent judgments were more likely based on what reasonable patients might expect rather than what reasonable doctors might do. A surgeon's duty of care includes giving sufficient information to patients where a significant risk has been established. Based on the information provided during the consent process, the patient can then reach an informed decision as to whether to accept or refuse surgery with the associated risks.<sup>35</sup> Legal precedent in the United Kingdom (*Chester vs. Afshar* 2004) has established failure of notifying a serious adverse event with a risk greater than 1–2% as a breach in the duty of care.<sup>31,42</sup> As

reviewed above, the risks from late adhesive complications are serious and well in excess of the accepted threshold where it could be considered a breach in the duty of care not to inform patients. This is reflected by an increasing burden from medicolegal claims arising from late adhesive complications.<sup>35,43,44</sup> In negligence cases, patients often claim that insufficient information was provided and that, if it had been provided, consent would not have been granted. On this basis, the NHS Litigation Authority, which handles negligence claims made against NHS bodies in England, paid settlements of over £3.3m during the period 2001–2007 for 57 adhesion-related claims, with at least 16% of these (9/57 claims) specifically relating to consent issues.<sup>35</sup>

In summary, late complications from adhesions are serious and frequent. Practice must change and late adhesive complications of surgery should be included in the preoperative consent process. This change in practice could decrease litigation costs but, more importantly, also underpins the doctor–patient relationship.

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