

Evaluation of Operative Notes Concerning Laparoscopic Cholecystectomy: Are Standards Being Met?

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Abstract

Background Laparoscopic cholecystectomy (LC) is the most performed minimal invasive surgical procedure and has a relatively high complication rate. As complications are often revealed postoperatively, clear, accurate, and timely written operative notes are important in order to recall the procedure and start follow-up treatment as soon as possible. In addition, the surgeon's operative notes are important to assure surgical quality and communication with other healthcare providers. The aim of the present study was to assess compliance with the Dutch guidelines for writing operative notes for LC.

Methods Nine hospitals were asked to send 20 successive LC operative notes. All notes were compared to the Dutch guideline by two reviewers and double-checked by a third reviewer. Statistical analyses on the “not described” items were performed.

Results All hospitals participated. Most notes complied with the Dutch guideline (52–69%); 19–30% of items did not comply. Negative scores for all hospitals were found, mainly for lacking a description of the patient's posture (average 69%), bandage (94%), blood loss (98%), name of the scrub nurse (87%), postoperative conclusion (65%), and postoperative instructions (78%). Furthermore, notes from one community hospital and two teaching hospitals complied significantly less with the guidelines.

Conclusions Operative notes do not always fully comply with the standards set forth in the guidelines published in the Netherlands. This could influence adjuvant treatment and future patient treatment, and it may make operative notes less suitable background for other purposes. Therefore operative note writing should be taught as part of surgical training, definitions should be provided, and procedure-specific guidelines should be established to improve the quality of the operative notes and their use to improve patient safety.

Introduction

Laparoscopic cholecystectomy (LC) is the most performed minimally invasive surgical procedure performed by both junior and senior physicians (approximately 15,000–19,000 are performed annually in the Netherlands) [1–3]. It is the method of choice for gallbladder removal, and in the Netherlands the Dutch Society of Surgery has adopted a guideline for performing the procedure [4] (for the English translation see Figure 3 in Wauben et al. 2008 [5]). However, the complication rate (e.g., trocar injury, injury to the common bile duct, vascular injury) is still relatively high in comparison to open cholecystectomy: the rates for bile duct injury range from 0.3 to 0.5% [1–3, 6–8]. As these complications are often revealed postoperatively, accurate operative notes are important in order to recall the procedure and start follow-up treatment (e.g., surgical intervention such as relaparotomy, percutaneous drainage, or nonsurgical intervention, such as placing a stent or the performance of percutaneous transhepatic dilatation) as soon as possible [1–3, 8–12].

Operative notes written by the surgeon are used for systematic documentation of every operation and are an essential element in safe patient care and follow-up [9–15].

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In addition, they are useful for research, education, medico-legal cases, and quality assurance [8–21]. Although all of these issues require registration of particular items, general requirements have to be met: operative notes have to be clear, accurate, and written in a timely fashion [12, 21].

To assure surgical quality and communication with other healthcare providers (e.g., nursing staff, general practitioner, surgeon performing follow-up consultation), associations and organizations have dictated explicit standards (guidelines) concerning the time frame and content of operative notes [22–24]. All such guidelines have similar standards (Table 1), but previous research has shown that these standards are not always upheld. The time frame between surgery and operative note writing (dictation) is often unclear, and the quality of the operative notes is variable and poor [14, 15, 17, 18, 20, 21].

The aim of the present study was to assess compliance with the Dutch guideline for writing operative notes concerning laparoscopic cholecystectomy.

Materials and methods

Data collection

Nine hospitals (i.e., two academic hospitals, six teaching hospitals, and one non-teaching hospital) were contacted to participate in the study. To be included, each hospital had to collect and send 20 successive LC operative notes. The names of the hospitals, patients, and staff could be obscured for privacy reasons, but it was important to be able to see whether names had been filled out.

Data analysis

All operative notes were blinded to the reviewers for the different hospitals. All notes were compared by two reviewers to the different items of the guideline of the Dutch Society of Surgery (edition 2002) [23] and rated item by item as “described (1),” “not described (0),” or “not applicable.”

To reach interrater agreement, two operative notes were fully analyzed by two different reviewers (with no medical background) and compared and discussed with a third reviewer (L.W.). No systematic differences between the three reviewers were observed. However, it was decided in consultation with a surgical expert (J.L.) to rate the items “antibiotic prophylaxis,” “complication(s),” “specific medication,” “drains, etc.,” and “histology” as “not applicable” because these were not mandatory according to

Table 1 Content and time frame described in guidelines for operative note writing [22–24]

	DSS—2002	RCS—2008	JC—2008
Procedure date	×	×	
Procedure time		×	
Consultant name		×	
Name patient	×		
Gender patient	×		
Date of birth patient	×		
PID number patient	×		
Operator	×	×	×
Assistant(s)	×	×	×
Anesthetist	×	×	×
Scrub nurse	×	×	×
Indication for surgery	×	×	
Type of anaesthesia	×		
Antibiotic prophylaxis	×		
Patient posture	×		
Incision	×	×	
Confirmation expected general pathology	×	×	
Unexpected events/complications	×	×	
Extra procedure(s)		×	
Procedure performed:			×
Remove gallbladder	×	×	
Haemostasis	×		
Closure	×		
Type of sutures/staplers	×	×	
Bandage	×		
Specific medication	×		
Drains/catheters/probes	×		
Histology	×		
Blood loss	×		×
Postoperative conclusion/summary	×		×
Postoperative instructions/treatment	×	×	

DSS Dutch Society of Surgery, RCS Royal College of Surgeons England, JC Joint Commission

the LC guidelines [4]. The two reviewers then reviewed all notes independently, and then came together to discuss any uncertainties. All ratings were double-checked by the third reviewer.

Statistical analyses were performed on the “not described” ratings of the operative notes using SPSS 16.0 for Mac. The Kruskal–Wallis test was then performed, followed by exploratory Mann–Whitney *U*-tests. The Bonferroni adjustment for multiple comparisons was applied.

Results

All nine hospitals participated in the study: two academic hospitals (A1, A2), six teaching hospitals (T1–T6), and one non-teaching hospital (C1). Teaching hospital T6 did not send the complete operative notes: patient and staff information (steps 1–3, Table 2) were deleted for privacy reasons. Hospital T5 only sent eleven operative notes.

Compliance with reporting content per hospital

Figure 1 shows that most hospitals' notes comply with the Dutch guideline (52–69%); only 19–30% of the items in the notes did not comply. Table 2 provides the percentages (per hospital) at which the notes described specific items or at which items were not applicable.

Table 2 shows that items related to patient information were described in most notes, except for the description of the patient gender in the notes of hospitals T3 and T5. The procedure date was described in all notes.

Provision of the names of the operator, assistant(s) and anesthetist complied with the guidelines in most cases (on average in 100, 84, and 92% of cases, respectively). However, the name of the scrub nurse was given only in most notes of hospital T3.

The indication for surgery was described in all operative notes. Also, all hospitals (except C1) described the type of anesthesia in most notes. Antibiotic prophylaxis was often not applicable (average 79%). The patient's posture was described in 50% of notes of hospitals A1 and T2. Notes from the remaining hospitals included fewer descriptions of patient posture (10–45% of cases). Hospital C1 did not describe patient posture at all. Item 5.4 "incision" was described in most operative notes (average 95%).

In seven hospitals most notes (55–95%) confirmed the expected general pathology. However, the notes from hospitals T4 and T6 described the expected general pathology in only 30 and 50% of cases, respectively. On average, complications and unexpected events (e.g., bleeding, iatrogenic gallbladder perforation) occurred in 44% of cases and were documented in all hospitals' notes, including the additional procedures performed to treat the complication.

Removal of the gallbladder was described in all operative notes. On average 81% of notes described "checking for hemostasis" as part of the procedure. Step 5.8 "closure" was described in all hospitals notes, except for two notes (10%) from hospital T6. "Types of suture" was described in most notes (85–100% of cases), except for the notes of hospital C1, which described the type of suture in only 45% of cases. "Type of bandage" was described in very few notes (average 6%).

Step 6.1 "administering specific medication" and step 6.2 "placing of drains or removing catheters" were often noted as not applicable (average 79 and 87%, respectively). Sending the retrieved gallbladder for histology was described in 10–65% of cases. In the remaining cases this step was rated "applicable." The amount of blood loss was described in one note each from hospitals A1, T5, and T6.

None of the hospitals' notes described both the postoperative conclusion and the postoperative instructions. Notes from hospitals A1, T2, T3, and T6 mostly included postoperative conclusions (50–90%), whereas the notes from hospitals T1 and T4 stated the postoperative instructions (75 and 100%, respectively). The notes from hospitals A2 and T5 included neither of these items.

Differences between hospitals for "not described" items

The average percentages of items "not described" per operative note were compared by hospital (Fig. 2). Hospital T6 was excluded from this comparison because of the large amount of missing data.

Figure 2 shows that hospitals C1, T3, and T5 have the highest mean scores in items "not described" in their operative notes. Mann Whitney *U*-tests (with the Bonferroni correction; significance $p < 0.0018$) showed significant differences between hospital C1 and all other hospitals except hospitals T3 and T5 (Table 3). No significant differences were observed between hospitals T3 and T5. Hospitals T3 and T5 show significant differences between hospitals A1, A2, T1, and T4. Furthermore, no significant differences were observed between hospitals A1, A2, and T1. Hospital T2 only showed significant differences with hospitals C1 and T4.

Discussion

Accurate and complete operative notes are considered a critical element of quality assurance in surgery. However, operative notes are often incomplete, impeding the patient's postoperative management. Standards and guidelines aim to improve operative note writing. Although a guideline is not a law, it still has to be observed as good practice. If a surgeon deviates from the guideline, a reason has to be provided.

Although the present study shows an average overall compliance of 62%, in 24% of all LCs recorded in the participating hospitals, the operative notes did not comply with the Dutch guideline (in 14% of cases items were designated "not applicable"). Negative scores for all hospitals were mainly attributable to the lack of a description of patient posture (average 69%), type of bandage (94%),

Table 2 Percentages of items on the Dutch guideline described or not applicable (n/a), by hospital

Step no.	Items	A1	A2	C1	T1	T2	T3	T4	T5	T6	Total average per item	Total average per category ^a
1.1a	Name patient	100	100	100	100	100	100	100	100	md	100	94
1.1b	Gender patient	100	100	100	100	100	0	100	0	md	75	
1.2	Date of birth patient	100	100	100	100	100	100	100	100	md	100	
1.3	PID number	100	100	100	100	100	100	100	100	md	100	
2.	Procedure date	100	100	100	100	100	100	100	100	md	100	100
3.1	Operator	100	100	100	100	100	100	100	100	md	100	72
3.2	Assistant(s)	85	100	25	85	100	80	100	100	md	84	
3.3	Anesthetist	100	95	85	100	55	100	100	100	md	92	
3.4	Scrub nurse	0	0	5	0	0	80	0	18	md	13	
4	Indication for surgery	100	100	100	100	100	100	100	100	100	100	100
5.1	Type of anesthesia	100	100	35	80	100	85	100	91	65	84	68
5.2	Antibiotic prophylaxis	25		10			25	25		10	11	
		75	95	70	100	95	15	75	100	90	79	
		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
5.3	Patient posture	50	15	0	40	50	30	10	45	40	31	
5.4	Incision	85	100	100	90	100	85	100	91	100	95	
5.5a	Confirmation expected general pathology	70	80	95	95	85	60	30	55	50	69	
5.5b	Unexpected events/complications	60	45	25	55	40	55	65		50	44	
		40	55	75	45	60	45	35	100	50	56	
		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
5.6	Remove gallbladder	100	100	100	100	100	100	100	100	100	100	
5.7	Hemostasis	75	75	100	95	90	65	100	73	55	81	
5.8	Closure	100	100	100	100	100	100	100	100	90	99	
5.9	Type of sutures/staples	100	100	45	95	100	85	85	100	90	89	
5.10	Bandage	5	30	0	0	10	10	0	0	0	6	
6.1	Specific medication	20	20	25	20	60	5			40	21	x
		80	80	75	80	40	95	100	100	60	79	
		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
6.2	Drains/catheters/probes	10		30	15	15	25	10		10	16	
		90	100	70	85	85	75	90	100	90	87	
		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
6.3	Histology	15	65		10	60	35	35		45	29	
		85	35	100	90	40	65	65	100	55	71	
		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
6.4	Blood loss	5	0	0	0	0	0	0	9	5	2	2
7.1	Postoperative conclusion/summary	65	0	10	10	90	50	10	0	80	35	32
7.2	Postoperative instructions/treatment	10	0	0	75	0	5	100	0	5	22	

md missing data, n/a not applicable

^a Items n/a excluded

amount of blood loss (98%), name of scrub nurse (87%), postoperative conclusions (65%), and postoperative instructions (78%). Furthermore, the notes from hospitals C1, T3, and T5 complied significantly less with the guidelines when compared to most other hospitals' operative notes. For example, hospitals T3 and T5 did not describe the patient's gender.

Although some items to be included in the operative notes may seem to be logical and consistent components of all procedures, describing these items in every operative note minimizes the chance of overlooking them when they influence outcome (e.g., patient posture in relation to postoperative neuromuscular complications). Furthermore,

Fig. 1 Compliance with Dutch guideline for writing operative notes per hospital: percentages of items “described,” “not described,” or “not applicable.”

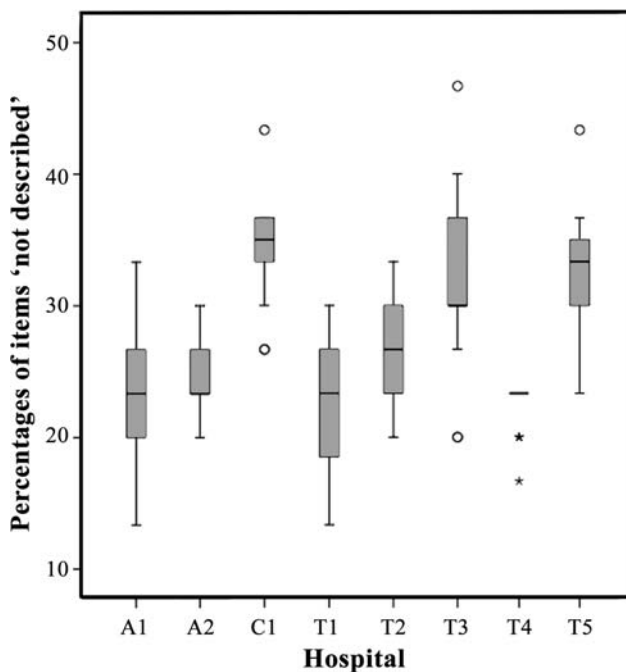
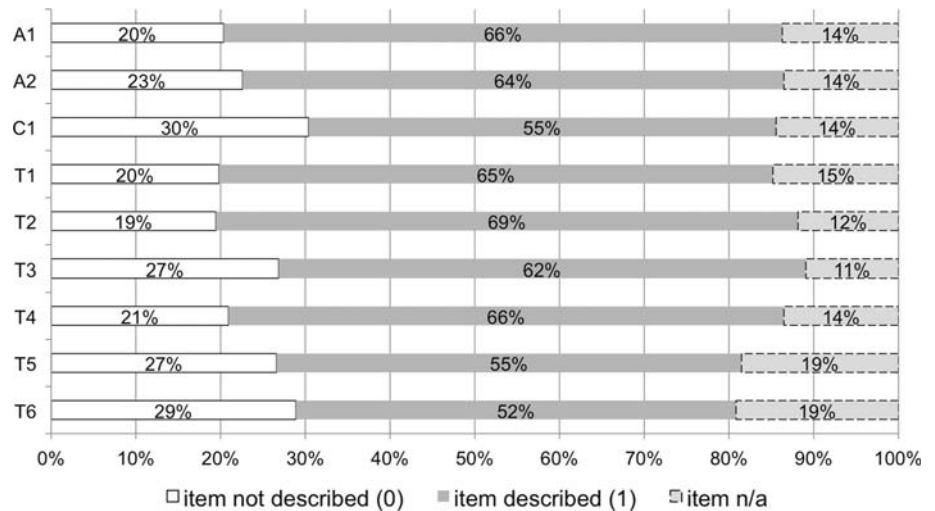


Fig. 2 Boxplot summaries for percentages of items “not described” per hospital (median, interquartile range, open circle outliers, and asterisk extreme cases)

as operative notes are often used for research purposes, audits, and medicolegal/risk management, including all the items detailed in the guideline is important [9, 10, 15].

Although the Dutch guideline requires describing both postoperative conclusion and postoperative instructions (in contrast to other guidelines that require only one of these items), none of the hospitals in the present series included both items. Furthermore, the notes from hospitals A2, C1, and T5 included neither. Reasons for not describing both items probably lie in their unclear definition. The lack of postoperative instructions in the notes from the

present study is relatively high (78% of cases) when compared to other studies (entailing different surgical procedures), which show average rates of 0–42% [9–11, 13, 14, 17, 20, 25].

Although the direct effect of failure to adhere to the guideline and of incomplete and inaccurate operative notes has not yet been studied, describing items 1–4 in Table 2 is vital for quality assurance. In addition, including the subsequent items (5–7) in the operative note has a direct effect on the patient’s postoperative management; therefore, not describing these items increases the safety risk. One of the complications of LC with a high socioeconomic impact is bile duct injury (BDI) [1, 3, 8]. De Reuver et al. showed that BDI was mostly (61%) diagnosed before patient discharge (usually within the first postoperative 24 h [3]) [1]. However, in 34% of cases BDI was diagnosed after discharge, with a mean time interval between LC and BDI diagnosis of 4 weeks. Other studies have shown similar results: the majority of BDIs were not recognized during initial surgery [3, 8]. Managing the complications caused by BDI (and other complications as well—e.g., bile leakage, stone spill) requires early recognition in order to reduce patient morbidity and improve the treatment outcome [1, 2, 6, 8]. Other complications, such as abdominal abscess, fistula formation, cystic duct stump leakage, dislocation of clips, bile duct stricture, and trocar site bleeding, might arise months or years after operation [2, 3, 6, 7]. When assessing the surgery retrospectively, the surgeon then has to rely on the operative notes, and this presents problems if the notes are not accurate and complete [6].

The current guideline for operative note writing is applicable to all types of surgical procedures, and so they include only general requirements for describing the intraoperative findings and actions. Although the present study shows that most intraoperative findings and procedures are described according to the guideline, it is

Table 3 Significant differences between hospitals for the “not described” items from the Dutch guideline (Mann–Whitney *U*-test; *p* values have been adjusted for multiple comparisons using the Bonferroni method)

<i>p</i> Value	A1	A2	C1	T1	T2	T3	T4	T5
A1	–	ns	<0.001	ns	ns	<0.001	ns	<0.001
A2	ns	–	<0.001	ns	ns	<0.001	ns	<0.001
C1	<0.001	<0.001	–	<0.001	<0.001	ns	<0.001	ns
T1	ns	ns	<0.001	–	ns	<0.001	ns	<0.001
T2	ns	ns	<0.001	ns	–	ns	<0.001	ns
T3	<0.001	<0.001	ns	<0.001	ns	–	<0.001	ns
T4	ns	ns	<0.001	ns	<0.001	<0.001	–	<0.001
T5	<0.001	<0.001	ns	<0.001	ns	ns	<0.001	–

ns not significant

recommended that more procedure-specific guidelines be developed. Ideally, the operative notes would consist of a general section and a procedure-specific section to allow a step-by-step operative description [16].

In the case of operative notes describing LC, the procedure-specific section should be linked to the procedural guideline provided by such (international) societies as the European Association of Endoscopic Surgery and the Society of American Gastrointestinal and Endoscopic Surgeons [26, 27]. The Dutch LC procedure guideline describes six key steps: (1) introduction of trocars under vision, (2) condition of gallbladder, (3) establishing critical view of safety (CVS), (4) placing of clips, (5) hemostasis of liver bed, and (6) removal of trocars under vision [4]. Steps 2 and 5 are already included in the general operative note’s guideline. Adding the description of steps 1, 3, 4, and 6 provides a better basis for postoperative care, as all of these steps may lead to complications [2, 6, 7].

The present study showed that complications were described in 44% of cases and, although not required by the Dutch guideline, actions to treat these complications were described in all these notes. However, it can only be assumed that in the remaining procedures no complications occurred. Therefore, if items are not applicable for a specific procedure (e.g., gallbladder perforation, assistance of scrub nurse, drains, specific medication, complications), these should be mentioned as well, proving that the notes are complete and that no items were forgotten [9].

Here we have considered the content of the operative notes, but the time frame for writing the notes and making them available is important as well (this study did not include this aspect). The Dutch guideline recommends that the operative notes are “dictated, made available, and added to the medical record as soon as possible” [23]. Other countries’ guidelines require the notes to be “dictated immediately after an operative or high-risk procedure, or if this is not possible, an operative process note

should be added” [22, 24]. The Joint Commission defines *immediately* as: “upon completion of surgery, before the patient is transferred to the next level of care” [24]. Adding a specific time frame for writing the operative notes to the Dutch guideline (e.g., within 24 h of the procedure) is advisable.

Although authorship of the operative notes is not studied here, it is expected that in teaching and academic hospitals most LCs are performed by residents, who then also write the operative note. A lack of formal education on operative note writing might account for the large gaps in reporting noted in the present study (24% of items in the guideline were not described). At present only 10–18% of institutions globally offer operative note writing as part of their residency program [10, 14, 15, 18, 19, 28], and most senior physicians have never received such training. Rogers et al. showed that residents were more likely to include accurate information about the suture used for closure, the dressing used, or the postoperative instructions than the specialists [20].

The present study did not focus on studying whether the data provided represented actual events that occurred during the operation (e.g., prophylactic administration of antibiotics). We believe that the results can be interpreted as a minimum level of deviation from the Dutch guideline. In addition, we have designed a follow-up study to establish whether the physician’s position, surgeon or resident, influences the completeness and accuracy of the operative notes. For the future, the direct effects of failure to adhere to the guidelines need to be studied as well.

To improve the quality of the operative notes and the use of that information to improve patient safety, operative note writing should be taught to physicians in training as well as senior staff who never received such training; definitions should be provided, and procedure-specific guidelines should be introduced [10, 15, 19]. Implementation of processing the operative notes as a final, cross-

checked part of the operation itself might improve reliability. Although not yet fully validated, there is a trend toward the application of information technology and services for operative notes. Systems like video registration of procedures, electronic aide-memoirs, surgical templates, and electronic reminders, will improve the accuracy and completeness of the operative notes [9–11, 13, 14, 16–21, 25].

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