

Improving the quality of operative notes for laparoscopic cholecystectomy: Assessing the impact of a standardized operation note

Abstract

Operation notes are fundamental in communicating patient care, resident education, information for surgeons and act as a resource tool for outcome improvement and research. Furthermore, they provide a mechanism for health care reimbursement and an improvement in quality of care. There is increasing realization of the value of synoptic operative notes which are templated and procedure specific. Inclusion of archived (and retrievable) video recordings and intra-operative photographs may enhance reporting, not just of surgical procedures but in many areas of medicine. As part of change management in surgery physician and patient concerns regarding privacy, data protection, and potential medico-legal exposure need to be addressed. Laparoscopic cholecystectomy (LC) is one of the commonest operations performed globally, with over 1.1 million procedures per annum in the United States alone. To understand the patient's path to recovery and potential adverse outcomes, which may occur in up to 20% of patients, requires a transparent description of operative findings and procedures is advisable.

Keywords: operative notes, laparoscopic cholecystectomy, standardized operation note

Introduction

Operative notes are the recognized standard for documenting the details of an operation. They allow the communication of intraoperative events to other healthcare professionals, which can significantly impact future clinical decisions and operative procedures. Accurate and completed documentation has been correlated with good clinical care [1]. Furthermore, operative reports have an important role in medico-legal conflicts as well as quality assurance [2].

Despite their importance the quality of operative reports is often poor with critical aspects of the procedure frequently missing. The National Confidential Enquiry into Peri-Operative Death has identified documentation deficiencies as an increased risk for litigation and identified an urgent need for improvement. The Royal College of Surgeons (RCS) has established generic guidelines outlining the minimum information required within operative notes, and standardization using procedure-specific operation notes has been shown to significantly improve adherence to these guidelines for hip hemiarthroplasty [3].

Laparoscopic cholecystectomy is the most commonly performed minimally invasive surgical procedure in the UK, with over 50,000 procedures performed annually and is associated with a relatively high incidence of complications [4], which are often only clinically apparent in the post-operative period, therefore clear and accurate operative notes are essential for the reviewing clinician. Further, a delay in recognition of complications correlates with the subsequent risk of litigation [5]. The Dutch Society of Surgery, incorporating previous guidelines from several international societies, has published specific guidance detailing a stepwise protocol for safe laparoscopic cholecystectomy [6]. Nonetheless, poor documentation of each step of this protocol has been demonstrated, including deficiencies in recording

ng of trocar insertion, establishment of the critical view of safety, and gallbladder condition [7]. Poor or illegible documentation of surgical procedures often results in complications being indefensible in the face of litigation [7]. The aim of this review is to evaluate the quality of laparoscopic cholecystectomy operative notes.

Operative notes

Operative notes are an essential part of medical documentation for patients undergoing surgical procedures. They are pertinent to establish a continuum of care with other members of a multidisciplinary treating team. In the present time of rising standards of patient care and increasing litigation, the importance of well-written operative notes cannot be over-emphasized. Surgical operative notes constitute a crucial part of patients' medical records [8]. They provide first-hand information regarding the procedure performed and operative findings during any surgical intervention.

This document is essential for both immediate as well as long-term care and safety of the patient [9]. Aside from the more obvious medical implications, the quality of the notes has economic and medico-legal ramifications. They are often used in medico-legal cases, and patients have a legal right to access these records [8]. Handwritten operative notes are generally produced as evidence in medico-legal cases and incomplete or illegible notes can weaken the surgeon's defense [10]. However, many electronic health records (EHR), have included software programs to create electronic operative notes.

The goal of any EHR system is to create a system that is user-friendly, flexible, and inexpensive, while reducing errors, assuring that all pertinent clinical and billing information is recorded, and minimizing completion time. Electronic templates minimize the data that must be entered and are therefore easier to use. They can also be designed to prompt users to enter critical information to conform to medical, legal, and billing standards [11]. Generally, operative notes are written by one of the junior members of the scrubbed team, guided by a senior surgeon, often considered an important part of the training itself.

Review of Literature

Various studies have tried to evaluate and appraise the quality of operative notes at multiple centers to suggest practice improving solutions. In a study from District General Hospital, Manchester, Mathew et al. evaluated 41 elective and 11 emergency operations for their operative records. Of these, 21 records were entered by the registrars and 31 by the consultants. The type of operation was mentioned in all the notes. The time of operation was recorded in 16% of the notes written by the registrars and 6% of the notes recorded by the consultants. Patient identification was not noted by 10% of registrar's and 6% of notes entered by the consultants. 19% of the consultant's notes did not mention the type of incision.

Operative complications were included in 16% of the consultant's notes but none of the registrar's notes [12]. A study conducted by Hamza et al. from Sudan revealed that the date and time of surgery were noted in 98% and 81% of the operation records, respectively [9].

In a more detailed study from a tertiary care teaching hospital from India, Huda et al. evaluated 193 surgical cases and found operative notes in only 173 cases. However, none of the operation notes met all 27 standard

variables set by the Royal College of Surgeons (RCS). In 74.5% of notes, date and in 89.5%, time of surgery was missing. As all the notes were handwritten, legibility was a significant variable affecting the quality of notes, with 12.7% of operation notes illegible. Illegible operation notes are challenging to understand and can compromise the safety of the patient.

In 50% of records, the position of the patient was not mentioned. Describing the preoperative findings is an imperative part of any operation note and was missing in 27% of the records evaluated. They also found a lapse in the documentation of patient identifiers in 92% of notes, which is a critical safety issue. The study also revealed that thromboprophylaxis was not recorded in any of the operation notes [8]. In a quality audit of operative notes from the UK, a study found that post-operative instructions were absent in approximately 75% of operation notes. The details of prostheses were rarely mentioned. The same study revealed that 70% of their operation notes were illegible [13]. Overall, these studies highlight critical omissions in writing operation notes despite established best practice guidelines. Some of these omissions seriously endanger patient safety, and thus the importance of well-written operation notes cannot be overemphasized. **Format of operative notes** The writing of operative notes varies from place to place, with various hospitals having their format of writing them. Different surgical societies and statutory bodies have given guidelines for writing comprehensive operative notes. The most notable of these was the Royal College of Surgeons (RCS) guidelines, first published in 1990 and later modified in 1994 [14]. The Good Surgical Practice was developed by the RCS and later modified in 2014, highlighting the importance of quality operation notes.

The RCS state in their publication that the operating surgeons must ensure that there are clear operation notes for every procedure, which should contain sufficient detail to enable continuity of care [14]. In practice, the level of detail recorded in operation notes is highly variable and, at times, illegible. Poor or illegible documentation can compromise medical record-

keeping, quality of patient care, and even patient safety. Well-

designed proformas for procedures have been shown to standardize and improve the quality of information recorded, compliance with gold standards, and improved postoperative care [15].

Operation notes must be written immediately after the surgery, preferably by a member of the operating team. They can be typed, as suggested by the RCS, or even handwritten. There has been a move to ward-stem-plate-based operation notes to standardize the layout and postoperative instructions, making them easier to understand, especially in elective cases. The operation note should accompany the patient into post-

operative recovery and the ward to allow continuity of care by another doctor [16]. **Guidance of operative notes**

Well-written operative notes include all the characteristics of the pre- and post-

procedure, plan of management, and establish the patient's responsibility to the operative team during the whole process of surgery.

The components of operative notes include:

- (i) Date and time of the procedure
- (ii) Patient details
 - Hospital sticker/handwritten patient details
- (iii) Staff details
 - Operating surgeon and grade
 - Surgical assistant and grade
 - Consultant overseeing care
 - Anesthetist and grade
- (iv) Diagnosis
 - Preoperative diagnosis
 - Postoperative diagnosis

(v) Full title of the operation carried out • List from major to minor • No abbreviations (v) Type of the anaesthesia used

(vi) Operative findings

- Visual examination and abdominal palpation findings
- Pathological findings
- Any relevant negative findings?
- As much detail as possible – site, size, color, the volume of structure involved
- Picture aids • Any difficulties?
- Blood Loss

(vii) Surgical steps

- Position
- Preparation and draping
- Incision (what instrument you used)
- Step by step description of surgical steps undertaken
- Sutures used and type of suturing (locking, continuous)
- A written justification of unusual steps
- Drains in-situ/catheter – what is draining at the end of the procedure
- Any samples obtained – how you took them
- Swabs, needles, and instrument checked

(viii) Postoperative plan-

Important guidance on managing the patient in the postoperative period Immediate

- Analgesia
- Medications
- VTE assessment

- Nutrition-fluids/eatinganddrinking
 - Cathetermanagement
 - Detailsofspecificdrains/dressing/packs/devices–whenshouldtheyberemoved
 - Samplesforthelab
 - Routinepost-opcarevs.closemonitoring/observations•AnestheticconcernsHospitalStay
 - Suture/Staplescare
 - Bloodtests
 - Specificnursing/midwiferyinstructions•Anyspecialistinputneeded,e.g.,physio
 - Patientdebrief–planforfuture,e.g.,nextdelivery/contraception•Discharge–
whenandbywhom•Followup
- (ix) 'TheSign-Off.'•Printyourname[Stamp]
- Signthenotes
 - Leavecontactdetails

Standardizedoperativenotesforlaparoscopiccholecystectomy

Laparoscopiccholecystectomy(LC)involvestheinsertionofalaparoscopeandspecializedinstruments throughsmallincisions,allowingformagnifiedvisualizationandprecisedissectionofthegallbladder. Thisapproachoffersseveraladvantages,includingreducedpostoperativepain,shorterhospitalstays,fast errecovery,improvedcosmeticoutcomes,andearlierreturntonormalactivities[17].Thesebenefitshave contributedtothewidespreadadoptionoflaparoscopiccholecystectomyasthestandardapproachforcholecystectomy.LChasbeenassociatedwithhigherpatientsatisfactionratesduetoreducedpostoperative pain,improvedcosmeticoutcomes,shorterrecoverytimes,andearlierreturntonormalactivities.Patients appreciatetheminimalscarringandfasterresumptionofdailyroutinesassociatedwithlaparoscopy[18].

For decades, the narrative operative report (NR) has been used in this manner. This reporting method, however, is subjective by nature and often lacks essential information [19]. Given the fact that proper documentation is an essential part of patient safety and quality of care, many in the surgical field have experimented with or even have implemented standardized or synoptic reporting (SR) as a substitute. The word synopsis is derived from two ancient Greek words: σύν (sún, “with or whole”) and ὄψις (ópsis, “view”) and can be interpreted as a concise description of—in this case—

a surgical procedure. An SR provides summarized documentation containing predefined leading criteria of the surgical procedure, which can effortlessly be completed in computerized templates [20].

This synoptic way of reporting can also be achieved by providing easily comprehensible aide-memoires. By adding quality of care indicators to this documentation method, these factors can be monitored efficiently without the need for double entries in a separate report. A good example of an electronically stored SR can be found in a study by Vergis et al. [21] focusing on Roux-en-Y gastric bypass. Worldwide, over seven million patients suffer major complications following surgery every year. One million of these patients will die during or immediately after surgery as a result. Around half of these adverse events are potentially preventable [22].

Checklist usage in surgery results in thousands of patients' lives being saved each year. One of the best-known examples is the 19-item WHO Surgical Safety Checklist which was developed to decrease errors and adverse events and increase teamwork and communication [23]. This checklist reduced morbidity and mortality rates by more than one-third across all participating hospitals. Earlier publications determined the lack of available information in the traditional reports. Wauben et al. demonstrated that NRs in laparoscopic cholecystectomy contained fewer essential procedural steps compared to what could be seen on operative video recordings [24].

Another study on laparoscopic cholecystectomy concluded that cases with bile duct injury contained fewer key elements of the report than those without bile duct injury, a phenomenon likely caused by surgeons tending to focus more on reporting unusual events rather than reporting the essential steps of the operation [25]. Apart from this explanation, it is plausible that, due to medico-legal concerns and fear of litigation, surgeons may, consciously or not, omit some part of the operative report when intraoperative complications occur. Furthermore, several studies reported improved efficiency, higher patient acuity level, higher physician satisfaction, and reduced administrative costs in SRs. However, the extent of the superiority of SR and the ideal construction of the operative report remain unknown [26].

Previous studies have demonstrated poor compliance of operation notes with the DSS guidelines for laparoscopic cholecystectomy when written without the assistance of a proforma [26]. In addition, procedure-specific proformas have been shown to improve compliance with documentation guidelines for hip hemiarthroplasty and Caesarean section, with potentially beneficial consequences for medical litigation rates [27]. Wauben et al. have previously observed differences in operative documentation completeness between residents and attendings for laparoscopic cholecystectomy (with better performance among residents in their series) and have suggested that a procedure-specific template based on established guidelines could improve the quality of operation notes [28].

Borchert et al. have highlighted that there is little formal teaching of operation note writing during surgical training [29], and the use of proformas can assist more junior surgeons in documenting a complete record of the operation. Thomson et al. believe that the use of procedure-specific proformas, based on established guidelines for minimum documentation datasets can have a useful role in facilitating the production of more complete and medico-legally robust operation notes. Thomson et al. proforma has proved popular with surgeons, as demonstrated by its high usage levels across three hospital sites (97%). With guidelines increasingly being used to defi-

new standards for clinical practice in medical litigation [30] it is vital to make the process of authoring guideline-compliant operation notes straightforward, through innovations including proformas.

Completion rates

In a multi-

institutional evaluation of synoptic operative reports (SORs) versus dictated operative reports (DORs) in 35 patients undergoing LC, Dea and colleagues reported completion rates of 99.7% for SORs versus 76% for associated DORs. Moreover, 87% of surveyed surgeons in the study indicated a preference for the synoptic format. A brief narrative comment was added in 48.5% of cases. In addition, synoptic operative report was easy to use (PD 67%, LC 93%), they would use the synoptic operative report over dictated operative report (PD 83%, LC 87%), and synoptic operative report would improve the ability to conduct QI projects (PD 67%, LC 87%). They also exhibited that Benefits of using synoptic operative reports included: perceived value of standardized reporting, the ability to conduct quality research, and reducing dictation costs [31].

Thomson et al. showed a significant improvement in documentation rates for procedural data upon introduction of a SOR for LC in a three-hospital NHS Trust, including operative time (82% SOR vs. 25% DOR), operative setting (95% SOR vs. 33% DOR), complications (83% SOR vs. 49% DOR), name of surgeon (99% SOR vs. 93% DOR) and signature (96% SOR vs. 88% DOR), but a decrease in documentation of the procedure date (89% vs. 99%) [32]. The authors also found a significant positive correlation between the surgical experience level and DOR completion rates ($p < 0.0001$), although the correlation was no longer significant following SOR introduction [32]. In a prospective series of 25 consecutive LC performed in a single institution, Shaikh et al. demonstrated a 79% completion rate in SORs versus 25% in DORs [33]

Intra-operative imaging recording

Intra-

operative photography during LC has been used to document the CVS. Adequacy of such photography in achieving the CVS was reviewed by two expert observers in a prospective audit of 100 consecutive LCs [34]. The measured rate of an adequate CVS was 52% and 45%, respectively. This raises the question of need for artificial intelligence or machine learning algorithms to help in assess completeness. Sanford and colleagues proposed a method of “doublet” photography which combines both anterior and posterior imaging of the CVS [35]. In this study of a series of 28 elective LCs, photographs of anterior, posterior and doublet view were rated by two independent surgeons. Anterior or posterior images alone received significantly lower ‘satisfactory’ ratings than doublet views (76.8% vs. 96.4%, $p = 0.02$). Buddingh et al. found IOC to be more conclusive than photography of the CVS for documentation of biliary anatomy, with 57% of IOCs conducted in 63 procedures deemed conclusive by blinded experts versus 25% for photographs of the CVS for the same procedures [36]. Eryigit et al. reported that video documentation of LCs adequately depicted surgical steps in 1005/1089 (92.3%) video observations compared to 849/1089 (78%) in operative notes ($p < 0.001$) [37]. The addition of audio recordings resolved some discrepancies between video recordings and operative notes, resulting in a drop in discrepancy from 23% with audio adjustment to 11.8% without ($p < 0.001$).

The integration of SORs into a hospital medical records system was addressed by Sakowska et al. [38]. The authors reported uptake of SORs for LCs rose from under 20% in the first month to 100% within the second month after introduction and remained $> 90\%$ for the next 7 seven months. SORs were immediately available when patients arrived in the recovery room and reached the electronic health record of the hospital withi

namediantimeof5min(IQR3–8min, $n = 425$),comparedtoamediantimeof2twodaysfortraditionalDORs(IQR1–5days, $n = 174$).

Synopticvsnarrativerreport

Synopticreportingmethodswere developedas aresultofthelackofessentialinformationintheNR.Despite thefactthatnewreportingtechniquesarebeingusedmorefrequently,obtainmentofscientific evidence regardingtheextentoftheaddevalueandadvantagesoftheSRwasneededtopromotefurtherincorporati onofsynopticreportingmethods[39].

In1994,astudywasconductedonmedicalrecordkeepinginwhich70%ofnoteswrittenbyconsultantswe reindecipherableinitspresentformbythenurseorjuniordoctorcollectingthedata[40].Tomakeusageof thesepoorlydictatedortypedoperativerreportsredundant,hospitalshaveimplementednewreportingmet hodsofwhichtheWeb-basedreportingtechniqueisthemostcommonlyusedcomputerizedSR.Itisdesignedtobeuser-friendly,anditcansavedatamuchfasterandeasierthantheNR.Web-basedreports,suchasWebSMR(SurgicalMedicalRecord),allowsurgeonstosecurelyaccessreportsint heoperatingroomoranyotherplaceconnectedtotheInternet.Itcontainsquestionswithdrop-downmenusandotherfunctionalities,suchasriskfactorcalculatorsandmandatoryresponsefieldsforess entialoperativesteps,toachieveamostcomprehensiveoverviewofthesurgicalprocedure[41].

In2019,acomparativereviewofsynopticoperativerreportingversusnarrativeoperativerrecordsfocusin gonbothuser-friendlinessandcompletenessofthehistoricalnarrativerreporttothesynopticoperativerreportconcluded thattherewasahighercompletionandaccuracyratecombinedwithalowercompletiontimewhenusingth esynopticoperativerrecordcomparedtohetraditionalnarrativerrecord.Similarfindingsupportingthea

Advantages of synoptic reporting have been found in other studies [42,43]. They also concluded that there is potential for better completion and accuracy rates when using synoptic operative reporting systems in a hybrid approach of narrative and synoptic methods which will lead to higher satisfaction among surgeons and other healthcare professionals [42]. In 2019, a systematic review and meta-analysis conducted by Stogryn et al. found that synoptic operative reports outperformed narrative reports [44]. In 2020, Robertson and Vergis [43] conducted a prospective comparative study to evaluate preoperative and intraoperative quality of care documentation in traditionally dictated reports. They compared dicto synoptic reports for rectal cancer surgery and concluded that the synoptic reporting method resulted in more accurate documentation compared to traditional dictated reporting methods. In 2021, St John et al. [45] conducted a prospective study to evaluate the consent process and associated documentation in breast and general surgery and concluded that there were higher error rates and omissions associated with handwritten forms compared to a standard template. Dyke et al. [46] conducted a study to evaluate the legibility, accuracy, and completion of the consenting process and to compare paper consent forms to digital forms. They included 223 patients who consented by using either paper consent forms or digital forms. They found that there were one or more errors associated with paper consent forms compared to zero errors associated with digital forms; therefore, they concluded that using a digital consent platform can improve the quality of the consenting process by reducing errors and is associated with better patients' decision-making experience.

Quality improvement plans require accurate and up-to-date data. Synoptic reports have been shown to be more complete than narrative ones. The electronic format facilitates ease of data collection and interpretation with the potential for electronic linkage with quality monitoring and improvement databases [47,48]. This could provide a powerful research tool. Advantage includes real-time data collection and reduced data collection time with the cost of the associated dedicated

staff. Some may feel that this addition to a data-overloaded system is unreasonable. However, a thorough and complete synoptic operative report provides a succinct platform with consolidated relevant patient data. This also decreases extraction time by eliminating the need to review multiple data sources. Synoptic operative reporting potentially affords ready access to relevant operative and anatomical information for care providers, permitting informed clinical decisions, and is especially pertinent in oncologic surgery where eligibility for, and coordination of, adjuvant treatments are reliant on key operative information. This is also vital to the management of postoperative complications, where details of the index procedure influence the approach to, diagnosis, and treatment of the surgical patient [49]. Individual studies reported additional advantages including higher inter-rater reliability, improved efficiency, decreased cost, and error rates for the synoptic platform. Enhanced reliability implies more consistent reporting between users and more consistent quality of documentation. Reduced completion time improves efficiency for surgeons. The reduced time to complete synoptic reports and their expedited availability in the medical record allows prompt access to operative information. This benefits patients and care providers especially when surgical complications occur in the first few post-operative days. Typically, dictated reports are unavailable for several days due to transcription times. Potentially reduced costs (-\$8.27/note) with a synoptic platform combined with its improved efficiency has the potential for enhancing health care system delivery. Synoptic operative reporting does have disadvantages however. Many surgeons feel synoptic reports are difficult to read and do not capture the true “flavour” of an operation with their lack of descriptive detail. A potential solution is to allow for free text sections for surgeons to elaborate on subtle features of the procedure pertinent to document when needed. For the trainee surgeon, there are perceived educational limitations to this format [50].

Program directors expressed concern that synoptic reports provide less educational value than narrative reports, [50] including the perception that trainees do not have to demonstrate the same knowledge and familiarity with the procedure and that it discourages independent thinking with respect to the procedure performed [50]. Perhaps synoptic reporting robs the trainee of this valuable cognitive task analysis tool; the act of recalling and describing the details of the procedure after the fact, provides essential reflection, analysis, and consolidation of knowledge of the procedure. One suggested approach to mitigate this is to allow trainees to dictate an operative report whilst the staff surgeon generates a synoptic report for the official medical record [50]. The opportunity for cognitive task analysis and feedback would be provided to the trainee. But in from surgeons and trainees may prove difficult as it requires an added step for surgical documentation and added time for review and feedback.

Synoptic reporting alternative

An alternative to synoptic reporting in LC was proposed by Stewart et al. The author hypothesized that if more attention were paid to the objectives of operative reports, their content would more predictably contain the most relevant information, which might channel thinking in beneficial directions during surgery. Using the method of cognitive task analysis, the authors identified a number of key steps in the performance of LC. By framing the surgeon's thinking, cognitive task analysis would be expected to reduce operative complications. Stewart and colleagues argued that supplanting a narrative operative report with a synoptic template (with limited free text input) would result in the loss of important information including contextual background [25].

Limitations

Potential limitations of using proformas include logistical considerations in ensuring ready access to the proforma at all locations where an operation is performed, and reluctance among surgeons to alter their established documentation practices. In addition the role of photographic demonstration of key steps, including establishing the critical view of safety, may be of use in making operative documentation more legally watertight in the future.

Conclusion

Synoptic operative reporting is a high quality, consistent, and feasible reporting method for documenting operative reports. When surveyed, the majority of participating surgeons indicated their preference for using synoptic operative reports and expressed their willingness to use them. Future implementation of synoptic operative reporting may require overcoming barriers of electronic medical record integration, ensuring meaningful use, and providing adequate information technology support.

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