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Assessing the Impact of a Standardized Operation Note to Improve the Quality for Laparoscopic Cholecystectomy

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Operation notes are essential for effectively communicating patient care, resident education, and information to surgeons and serve as a resource tool for research and outcome improvement. Additionally, they offer a mechanism for healthcare reimbursement and an enhancement in the care quality. There is an increasing recognition of the importance of synoptic operative notes that are procedure-specific and templated. The inclusion of archived (and retrievable) video recordings and intraoperative photographs has the potential to improve the reporting of a wide range of medical procedures, not just surgical procedures. Physician and patient concerns regarding privacy, data protection, and potential medico-legal exposure must be addressed as part of change

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management in surgery. Globally, laparoscopic cholecystectomy (LC) is one of the most frequently performed operations, with more than 1.1 million procedures performed annually in the United States alone. A transparent description of operative findings and procedures is recommended in order to understand the patient's path to recovery and potential adverse outcomes, which may occur in up to 20% of patients.

Keywords: Operative notes; laparoscopic cholecystectomy; standardized operation note.

1. INTRODUCTION

Operative notes are the accepted method for recording the specifics of an operation. They facilitate the exchange of intraoperative events with other healthcare professionals, which can have significant effects on future clinical decisions and operative procedures. Good clinical care has been correlated with accurate and comprehensive documentation [1]. Additionally, quality assurance and medico-legal conflicts are highly influenced by operative reports [2].

Operative reports are frequently deficient in quality, with critical aspects of the procedure frequently overlooked, despite their importance. Documentation deficiencies have been identified as an urgent need for improvement by the National Confidential Enquiry into Peri-Operative Deaths, which has also identified an increased risk of litigation. For hip hemi-arthroplasty, the Royal College of Surgeons (RCS) has established generic guidelines that define the minimum information that must be included in operative notes and has been demonstrated that the adherence to these guidelines is significantly enhanced by the standardization of procedure-specific operation notes [3].

In the United Kingdom, the most frequently carried out minimally invasive surgical procedure is laparoscopic cholecystectomy (LC), with an annual performance rate exceeding 50,000 and is associated with a relatively high complications incidence [4], which are frequently only clinically apparent in the postoperative period, consequently it is essential that the reviewing clinician have clear and precise operative notes. Additionally, the risk of litigation is correlated with a delay in the identification of complications [5]. Specific guidance on a step-by-step protocol for safe LC has been published by the Dutch Society of Surgery, which has incorporated previous guidelines from numerous international societies [6]. However, the documentation of each step of this protocol has been inadequate, as evidenced by the inadequacies in the recording of trocar insertion, the establishment of the critical view of safety, and the gall bladder condition [7]. Complications are frequently rendered indefensible in the context of litigation due to inadequate or illegible documentation of surgical procedures [7]. This review aims to assess the operative notes quality taken during LC.

Operative notes: Operation 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. The importance of well-written operation notes cannot be overstated in the current time of increasing patient care standards and litigation. 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 critically important for the patient's immediate and long-term safety and care [9]. In addition to the more apparent medical implications, the quality of the notes has economic and medico-legal implications. Patients have a legal right to access these records, and they are frequently used in medico-legal cases [8]. In medico-legal cases, handwritten operation notes are typically produced as evidence, and incomplete or illegible notes can erode the surgeon's defense [10]. However, many electronic health records (EHR), have included software programs to create electronic operative notes.

The objective of any EHR system is to establish a system that is user-friendly, flexible, and cost-effective, while simultaneously minimizing completion time, ensuring that all relevant clinical and billing information is recorded, and reducing errors. The data that must be entered is reduced by electronic templates, which makes them simpler to use. They can also be established to motivate users to input essential information in order to comply with medical, legal, and billing

regulations [11]. In general, operative notes are composed by a junior member of the scrubbed team, with the guidance of a senior surgeon. This documentation is frequently regarded as a critical component of the training process.

2. REVIEW OF LITERATURE

Various studies have tried to assess 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. The registrars entered 21 records, while the consultants entered 31. All of the notes mentioned the operation type. The registrars had recorded the time of operation in 16% of their notes, while the consultants had recorded it in 6% of their notes. 10% of the registrar's notes and 6% of the consultants' notes did not include patient identification. The type of incision wasn't described in 19% of the consultant's notes.

16% of the consultant's notes contained operational complications, while none of the registrar's notes did [12]. A study conducted by Hamza et al. in Sudan demonstrated that the date and time of surgery were recorded 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 established by the RCS. In 74.5% of notes, date and in 89.5%, time of surgery was missing. Legibility was a substantial factor that influenced the quality of the notes, as they were all handwritten, with 12.7% of operation notes illegible. Illegible operation notes are challenging to understand and may threaten the patient's safety.

The patient's position wasn't stated in 50% of the records. The description of the per operative findings is a critical component of any operation note, and it was absent from 27% of the records that were analyzed. They also found a lapse in the documentation of patient identifiers in 92% of notes, which is a critical safety issue. The study also demonstrated that thromboprophylaxis was not documented in any of the operation notes [8]. In a quality audit of operative notes from the UK, in approximately 75% of operation notes, post-operative instructions were absent, according to a study. Prosthetics were seldom discussed in detail. In the same study, it was discovered that 70% of the 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 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 each procedure is documented in clear operation notes that should include enough detail to facilitate the 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 towards template-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-op recovery and the wards 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 anesthesia 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/eating and drinking
- Catheter management
- Details of specific drains/dressing/packs/devices – when should they be removed
- Samples for the lab
- Routine post-op care vs. close monitoring/ observations • Anesthetic concerns Hospital Stay
- Suture / Staples care
- Blood tests
- Specific nursing/midwifery instructions • Any specialist input needed, e.g., physio
- Patient debrief – plan for future, e.g., next delivery/contraception • Discharge – when and by whom
- Follow up

(ix) 'The Sign-Off.' • Print your name [Stamp]
- Sign the notes
- Leave contact details

3. STANDARDIZED OPERATIVE NOTES FOR LAPAROSCOPIC CHOLECY-STECTOMY

LC includes the surgical insertion of a laparoscope and specialized instruments through small incisions, which enables the precise dissection and magnified visualization of the gallbladder. Several benefits are associated with this approach, such as improved cosmetic outcomes, faster recovery, minimized postoperative pain, shortened hospitalization stays, and earlier return to normal activities [17]. The widespread adoption of LC as the standard approach for cholecystectomy has been facilitated by these benefits. Reduced postoperative pain, enhanced cosmetic outcomes, shorter recovery times, and an earlier return to normal activities have all been associated to increased patient satisfaction rates with LC. Patients appreciate the rapid resumption of daily routines and minimal scarring that are associated with laparoscopy [18].

The narrative operative report (NR) has been utilized in this manner for decades. Nevertheless, this reporting method is subjective in nature and frequently fails to provide essential information [19]. Many individuals in the surgical field have experimented with or have even implemented standardized or synoptic reporting (SR) as a substitute, as proper documentation is a critical component of patient safety and quality of care. Two ancient Greek words are the source of the term "synopsis": σύν (sún, “with or whole”) and ὄψις (ópsis, “view”) and can be understood as a brief description of a surgical procedure in this case. A summary report (SR) is a type of document that contains predetermined leading criteria for the surgical procedure and can be easily completed using computerized templates [20].

By offering aide-me´moires that are easily comprehensible, this SR approach can also be

achieved. The incorporation of quality-of-care indicators into this documentation method enables the efficient monitoring of these factors without the necessity for duplicate entries in a separate report. Vergis et al. conducted a study that serves as an excellent illustration of an electronically stored SR [21] concentrating on Rouxen-Y gastric bypass. Every year, more than seven million patients worldwide face severe complications as a result of surgery. A million of these patients will succumb to death during or immediately following surgery. Approximately half of these adverse events are potentially avoidable [22].

Each year, the utilization of checklists in surgical procedures results in the preservation of the lives of thousands of patients. The 19-item WHO Surgical Safety Checklist is one of the most well-known examples, it was created with the objective of enhancing teamwork and communication, as well as reducing errors and adverse events [23]. Across all participating hospitals, the morbidity and mortality rates were reduced by over one-third as a result of this checklist. Traditional reports were found to be deficient in the availability of information in previous publications. Wauben et al. found that the number of essential procedural steps in NRs during LC was less than that observed on operative video recordings [24].

The findings of an additional investigation on LC indicated that the numbers of key elements in the report of cases with bile duct injury were lower than those without, this phenomenon is likely the result of surgeons' tendency to prioritize the reporting of unusual events over the necessary steps of the operation [25]. In addition to this explanation, it is possible that surgeons may, whether intentionally or unintentionally, omit a portion of the operative report when intraoperative complications arise, as a result of medicolegal concerns and potential litigation. Additionally, numerous studies have reported that SRs have improved efficiency, increased patient acuity, increased physician satisfaction, and reduced administrative costs. Nevertheless, the optimal construction of the operative report and the extent of the superiority of SR are still unknown [26].

Previous research has shown that operation notes are not in compliance with the DSS guidelines for LC when they are written without the use of a proforma [26]. Furthermore, it has been demonstrated that procedure-specific proformas can enhance adherence to documentation guidelines for hip hemi-arthroplasty and Caesarean section, which could have a positive impact on medical litigation rates [27]. Previously, Wauben et al. have found differences in the extent of operative documentation between attendings and residents during LC (exhibiting superior performance among their residents in a series) and have proposed that procedure-specific template that adheres to established guidelines could improve the operation notes quality [28].

Borchert et al. have emphasized that there is a dearth of formal instruction regarding the composition of operation notes during surgical training [29], and proformas can be used to help more junior surgeons document a comprehensive record of the operation. Thomson et al. indicate that the utilization of procedure-specific proformas, which are developed in accordance with established guidelines for minimum documentation data sets, can be beneficial in the facilitation of the production of more comprehensive and medico-legally robust operation notes. The Thomson et al. proforma has been well-received by surgeons, as evidenced by its high usage rates across three hospital sites (97%). With the increasing use of guidelines to establish clinical practice standards in medical litigation [30] it is imperative to simplify the process of composing operation notes that comply with guidelines by implementing innovations such as proformas.

Completion rates: Deal et al. stated completion rates of 99.7% for synoptic operative reports (SORs) and 76% for associated dictated operative reports (DORs) in a multi-institutional assessment of 35 patients undergoing LC. Additionally, the synoptic format was preferred by 87% of the surgeons who were surveyed in the study. In 48.5% of the cases, a brief narrative comment was included. Furthermore, the synoptic operative report was simple to use (PD 67%, LC 93%), and it would be preferred over a dictated operative report (PD 83%, LC 87%) and, the synoptic operative report would enhance the capacity to perform QI projects (PD 67%, LC 87%). Additionally, they demonstrated that the utilization of SORs resulted in the following advantages: the capacity to conduct high-quality research, the perceived value of standardized reporting, and the reduction of dictation expenses [31].

Thomson et al. found a significant rise in procedural data documentation rates as a result of the implementation of aSOR for LC in a three-

hospital NHS Trust, including signature (96% SOR vs. 88% DOR), name of surgeon (99% SOR vs. 93% DOR), operative setting (95% SOR vs. 3% DOR), operative time (82% SOR vs. 25% DOR) and complications (83% SOR vs. 49% DOR), however, a decline in the documentation of the procedure date (89% vs. 99%) [32]. The authors also discovered a significant positive correlation between DOR completion rates and surgical experience level ($p < 0.0001$), even though the correlation was no more significant following SOR implementation [32]. During a prospective series of 25 consecutive LCs conducted at a single institution, Shaikh et al. showed a 79% completion rate in SORs, whereas the rate was 25% in DORs [33].

Intra-operative image recording: The CVS has been documented through intraoperative photography during LC. Two expert observers assessed the effectiveness of this photography in achieving the CVS during a prospective audit of 100 consecutive LCs [34]. A CVS that was adequate was measured at 52% and 45%, respectively. In order to facilitate the assessment of completeness, this inquiry underscores the importance of artificial intelligence or machine learning algorithms. A "doublet" photography technique was proposed by Sanford and colleagues, which integrates both posterior and anterior imaging of the CVS [35]. In this investigation of 28 elective LCs, two independent surgeons evaluated photographs of the doublet, anterior and posterior, views. The satisfaction rates of posterior or anterior images were significantly less than those of doublet views (76.8% vs. 96.4%, $p = 0.02$). Buddingh et al. discovered that the documentation of biliary anatomy was more definitive with IOC than with photography of the CVS. Blinded experts determined that 57% of IOCs carried out in 63 procedures were definitive, while only 25% of photographs of the CVS were deemed definitive for the same procedures [36]. Eryigit et al. found that video documentation of LCs accurately represented surgical steps in 1005/1089 (92.3%) video observations than in 849/1089 (78%) operative notes ($p < 0.001$) [37]. Audio recordings were incorporated to address specific differences between video recordings and operative notes, which led to a reduction in discrepancy from 23% with audio adjustment to 11.8% without ($p < 0.001$).

Sakowska et al. conducted a study on the incorporation of SORs into a hospital based medical record system [38]. The authors reported that the adoption of SORs for LCs increased from under 20% in the first month to 100% within the second month of their introduction and was maintained at or above 90% for the subsequent seven months. SORs were immediately accessible to patients upon their arrival in the recovery room and were able to access the hospital's electronic health record within a median of 5 minutes (IQR 3–8 minutes, $n = 425$), as opposed to a median of 2 days for traditional DORs (IQR 1–5 days, $n = 174$).

Synoptic vs narrative report: The absence of critical information in the NR led to the development of SR methods. In order to encourage the continued integration of SR methods, Despite the increased utilization of new reporting techniques, it was necessary to obtain scientific evidence regarding the SR's added value and advantages [39].

A study on medical record keeping was conducted in 1994, and it was found that the nurse or junior doctor who collected the data found 70% of the notes written by consultants to be indecipherable in their current form [40]. The implementation of new reporting methods by hospitals has rendered these operative reports that are poorly dictated or typed redundant. The Web-based reporting technique is the most frequently implemented computerized SR. It is intended to be simple to use and can save data at a much faster and simpler rate than the NR. In the operating room or any other location that is connected to the Internet, surgeons can securely access web-based reports, such as WebSMR (Surgical Medical Record). It includes questions with drop-down menus and other functionalities, such as mandatory response fields for essential operative steps and risk factor calculators, to offer a comprehensive overview of the surgical procedure [41].

A comparative review of synoptic operative reporting and narrative operative records was conducted in 2019. The review focused on the historical narrative report's comprehensiveness and ease of use in comparison to the synoptic operative report. The results of the review indicated that the synoptic operative record demonstrated a higher end and accuracy rate and a shorter time to completion than the traditional narrative record. Other studies have yielded comparable results that substantiate the benefits of SR [42,43]. In addition, they determined that the potential to enhance completion and accuracy rates is present through

the implementation of synoptic operative reporting systems in a hybrid approach that combines narrative and synoptic methods, resulting in increased satisfaction among surgeons and other healthcare professionals [42]. Stogryn et al. conducted a systematic review and meta-analysis in 2019 and discovered that SORs were superior to narrative reports [44]. In 2020, Robertson and Vergis [43] implemented a prospective comparative study to assess the quality of care documentation in traditionally dictated reports between preoperative and intraoperative periods. After conducting a comparison with synoptic reports for rectal cancer surgery, they determined that the SR method produced more precise documentation than traditional dictated reporting methods. In 2021, St John et al. [45] executed a prospective study to assess the consent process and associated documentation in breast and general surgery and determined that handwritten forms were associated with high error rates and omissions when contrasted with a standard template. Dyke et al. [46] carried out a study to assess the legibility, accuracy, and completion of the consenting process and to contrast paper consent forms with digital forms. They comprised 223 patients who provided consent through either digital or paper forms. They discovered that paper consent forms were associated with one or more errors, while digital consent forms were not, consequently, they concluded that the quality of the consenting process can be enhanced by the use of concentric digital consent platforms, which is associated with a better decision-making experience for patients.

Accurate and current data is essential for the development of quality improvement plans. It has been demonstrated that synoptic reports are more comprehensive than narrative reports. The electronic format simplifies the process of data collection and interpretation, thereby enabling the potential for electronic linkage with quality monitoring and improvement databases [47,48]. This could be a potent research instrument. Real-time data collection and reduced data collection time are among the benefits, which are accompanied by the cost of dedicated staff. This addition to a system that is already overloaded with data may be perceived as unreasonable by certain individuals. Nevertheless, a comprehensive and conclusive synoptic operative report offers a concise framework that consolidates pertinent patient data. The extraction time is also reduced by eliminating the necessity of reviewing multiple data sources. Synoptic operative reporting has the potential to provide care providers with immediate access to pertinent operative and anatomical information, enabling them to make informed clinical decisions and is particularly important in oncologic surgery, where the eligibility for and coordination of adjuvant treatments are contingent upon critical operative information. This is also essential for the management of postoperative complications, as the approach to, diagnosis, and treatment of the surgical patient are influenced by the specifics of the index procedure [49]. Additional benefits of the synoptic platform were reported in individual studies, such as enhanced efficiency, increased inter-rater reliability, lower error rates and lower expenses. More consistent reporting between users and a higher quality of documentation are indicative of improved reliability. Surgeons' efficiency is enhanced by a reduction in completion time. Synoptic reports are completed in a shorter amount of time and are available in the medical record more quickly, which enables immediate access to operative information. This is particularly advantageous for patients and healthcare providers when surgical complications arise within the initial few days following the procedure. Due to transcription delays, dictated reports are typically unavailable for a period of several days. The synoptic platform has the potential to improve the delivery of healthcare by reducing costs (-$8.27/note) and increasing efficiency. Nevertheless, synoptic operative reporting does have its drawbacks. Numerous surgeons contend that synoptic reports are challenging to comprehend and fail to accurately represent the true essence of an operation due to their inadequate descriptive content. Another potential solution is to permit surgeons to provide free text sections in which they can elaborate on the subtle aspects of the procedure that are relevant to the documentation process when necessary. This format is perceived to have educational limitations for trainee surgeons [50].

Concerns were raised by program directors regarding the educational value of synoptic reports in comparison to narrative reports,[50] including the view that trainees are not required to exhibit a similar level of knowledge and familiarity with the procedure and that it discourages independent thinking in relation to the procedure being done [50]. It is possible that SR deprives 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 potential solution to this issue is to permit trainees to compose an operative report while the staff surgeon produces a synoptic report for the official medical record [50]. The trainee would be afforded the opportunity to analyze cognitive tasks and receive feedback. It may be challenging to secure the support of surgeons and trainees, as it necessitates an additional step for surgical documentation and additional time for review and feedback.

Synoptic reporting alternative: Stewart et al. proposed an alternative to SR in LC. The authors indicated that the content of operative reports would be more likely to contain the most pertinent information if the objectives were given more attention, this could potentially direct the thinker's attention in a beneficial manner during the surgery. The cognitive task analysis method was utilized by the authors to identify a number of critical steps in the performance of LC. Cognitive task analysis is anticipated to mitigate operative complications by structuring the surgeon's thought process. Stewart and colleagues stated that substitution of a narrative operative report with a synoptic template (which allows for limited free text input) would lead to critical information loss, such as historical context [25].

4. LIMITATIONS

Some possible limitations of utilizing proformas are the surgeons' reluctance to modify their standard documentation practices and the logistical challenges associated with ensuring that the proforma is easily accessible at all locations where an operation is performed. As well, the potential of photographic demonstrations of critical steps, such as the establishment of the critical view of safety, to enhance the legal integrity of operative documentation in the future.

5. CONCLUSION

Synoptic operative reporting is a feasible, consistent, and high-quality reporting method for the documentation of operative reports. The majority of surgeons who participated in the survey expressed their willingness to use SORs and indicated their preference for them. The future implementation of synoptic operative reporting may necessitate the surmounting of obstacles to electronic medical record integration, the provision of sufficient information technology support, and the assurance of meaningful use.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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