Quality of inguinal hernia operative reports: room for improvement

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Background: Operative reports (ORs) serve as the official documentation of surgical procedures. They are essential for optimal patient care, physician accountability and billing, and direction for clinical research and auditing. Nonstandardized narrative reports are often of poor quality and lacking in detail. We sought to audit the completeness of narrative inguinal hernia ORs.

Methods: A standardized checklist for inguinal hernia repair (IHR) comprising 33 variables was developed by consensus of 4 surgeons. Five high-volume IHR surgeons categorized items as essential, preferable or nonessential. We audited ORs for open IHR at 6 academic hospitals.

Results: We audited 213 ORs, and we excluded 7 femoral hernia ORs. Tension-free repairs were the most common (82.5%), and the plug-and-patch technique was the most frequent (52.9%). Residents dictated 59% of ORs. Of 33 variables, 15 were considered essential and, on average, 10.8 ± 1.3 were included. Poorly reported elements included first occurrence versus recurrent repair (8.3%), small bowel viability in incarcerated hernias (10.7%) and occurrence of intraoperative complications (32.5%). Of 18 nonessential elements, deep vein thrombosis prophylaxis, preoperative antibiotics and urgency were reported in 1.9%, 11.7% and 24.3% of ORs, respectively. Repair-specific details were reported in 0 to 97.1% of ORs, including patch sutured to tubercle (55.1%) and location of plug (67.0%).

Conclusion: Completeness of IHR ORs varied with regards to essential and nonessential items but were generally incomplete, suggesting there is opportunity for improvement, including implementation of a standardized synoptic OR.

Contexte : Les notes opératoires (NO) servent à documenter officiellement les interventions chirurgicales. Elles sont indispensables à des soins optimaux aux patients, à l'imputabilité des médecins, à la facturation de leurs actes, à l'orientation de la recherche clinique et aux vérifications. Les notes narratives non standardisées sont souvent de piètre qualité et incomplètes. Nous avons voulu vérifier l'exhaustivité des notes opératoires narratives concernant les réparations d'hernies inguinales (RHI).

Méthodes : Une équipe de 4 chirurgiens a créé une liste de vérification standardisée consensuelle comprenant 33 variables applicables à la RHI. Cinq chirurgiens experts des RHI ont classé ces éléments selon qu'ils leurs semblaient essentiels, préférables ou non essentiels. Nous avons passé en revue les NO des RHI ouvertes effectuées dans 6 hôpitaux universitaires.

Résultats : Nous avons passé en revue 213 NO et nous avons exclus les NO concernant 7 hernies fémorales. Les réparations sans tension se sont révélées les plus communes (82,5 %) et la technique plug-and-patch a été la plus fréquente (52,9 %). Les résidents ont dicté 59 % des NO. Sur les 33 variables, 15 étaient considérées essentielles et en moyenne, 10,8 ± 1,3 ont été incluses dans les NO. Parmi les éléments qui laissaient à désirer, mentionnons : première réparation c. réparation récurrente (8,3 %), viabilité du grêle dans les hernies incarcérées (10,7 %) et complications peropératoires (32,5 %). Parmi les 18 éléments jugés non essentiels, la prophylaxie contre la thrombose veineuse profonde, l'antibioprophylaxie et le degré d'urgence ont été mentionnés dans 1,9 %, 11,7 % et 24,3 % des NO, respectivement. Les détails spécifiques à la réparation ont été notés dans 0 à 97,1 % des NO, y compris la fixation de la prothèse au tubercule par des sutures (55,1 %) et la localisation du bouchon (67,0 %).

Conclusion : L'exhaustivité des NO consignées dans les cas de RHI a varié en ce qui a trait aux éléments jugés essentiels et non essentiels et les NO se sont généralement révélées incomplètes. On en conclut qu'il y a place à amélioration, entre autre par l'adoption d'un modèle synoptique standardisé de NO.

The operative report (OR) has traditionally been in the form of a narrative, which is dictated after the surgical procedure by either a surgeon or resident. Its role is multifaceted: it serves as both documentation of the procedure and as communication between health care providers in the perioperative and postoperative period. It is also essential for medicolegal purposes, quality assurance, research into practice patterns and patient outcomes, and for compensation in some jurisdictions.

In recent years, ORs have been examined and shown to be lacking in quality, completeness, timeliness and consistency. While several studies[1–5] have assessed the quality and completeness of ORs in the areas of surgical oncology, bariatric surgery, obstetrical/gynecological surgeries, Mohs micrographic surgery and orthopedic procedures, ORs for common general surgery procedures have not been examined in great detail. To our knowledge, the quality of narrative ORs for inguinal hernia repairs (IHRs) has not been studied to date even though IHRs are among the most commonly performed procedures by general surgeons. The purpose of this study was to examine the completeness of IHR narrative ORs in a large academic centre across 6 teaching hospitals.

Methods

Four surgeons (a high-volume hernia surgeon, 2 general surgeons and a surgical resident) developed a standardized checklist for IHR by consensus. The checklist included elements pertinent to demographics (date of operation, date of dictation, person dictating, surgeon, assistants, date of birth and sex of patient), intraoperative details (deep vein thrombosis [DVT] prophylaxis, preoperative antibiotics, type of anesthesia, operative urgency, complications, skin closure) and hernia details (preoperative diagnosis, procedure, side, postoperative diagnosis, hernia type, occurrence, type of repair, hernia sac, cord explored, cord structures identified, division of round ligament, ligation of round ligament, exterior oblique closed, method of fixation, ilioinguinal nerve identified or divided, testicle pulled down at end of case, ilioinguinal nerve block, hernia incarcerated). In addition, 1–7 variables unique to 6 different types of hernia repairs (prolene hernia system, Lichtenstein, plug-and-patch, Bassini, McVay, Shouldice) were included. Thus, in total 34–40 items were included in the checklist, depending on the type of repair.

Five high-volume hernia surgeons then evaluated the checklist and classified each element as essential, preferable or nonessential. Fifteen general items were determined to be essential by majority vote (agreement among at least 3 surgeons). All repair-specific items were classified as essential using the same method.

We conducted an audit of narrative ORs performed in 2009 at 6 teaching hospitals affiliated with the University of Toronto. Inclusion criteria for the study were patients undergoing elective or emergent open IHRs by any technique. A list of patients fitting the study criteria was generated by the Medical Records Department at each site. We reviewed the charts consecutively and retroactively, starting with procedures performed in November 2008 and continuing until we had reviewed the charts of approximately 50 patients at each site or all charts over the course of 2.5 years. Two medical students extracted the data from the patient charts on a pilot-tested data abstraction sheet. A senior author later reviewed all data.

We determined a completeness score for each OR according to both the checklist and the essential items list (Appendix, Table S1, available at cma.ca/cjs), and we assessed the OR based on the dictator (staff, senior resident, junior resident, dictator not specified) and repair type.

Results

Of the charts reviewed, we selected 213 ORs (range 3–45 per hospital) for audit. Of these, 7 ORs were for femoral hernia repairs and were excluded from the study. Details regarding patient and hernia characteristics are shown in Table 1. The level of training of the person dictating the OR was also recorded: 82 (39.8%) staff surgeons, 33 (16.0%) senior residents, 26 (12.6%) junior residents, 62 (30.1%) residents (year not specified) and 3 (1.4%) level of training (staff surgeon v. resident) not specified.

Completeness of demographic information ranged from 48.5% for date of birth to 100% for date of dictation, person

Table 1. Patient and hernia characteristics

Characteristic	No. (%), *n* = 206
Sex	
Male	167 (81.1)
Female	17 (8.3)
Not specified	22 (10.7)
Type of hernia	
Indirect	90 (43.7)
Direct	59 (28.6)
Pantaloon	11 (5.3)
Not specified	46 (22.3)
Side of hernia	
Right	103 (50.0)
Left	85 (41.3)
Bilateral	16 (7.8)
Not specified	2 (1.0)
Urgency of operation	
Urgent	14 (6.8)
Elective	36 (17.5)
Not specified	156 (75.7)
Type of repair	
Prolene hernia system	35 (17.0)
Lichtenstein	26 (12.6)
Plug-and-patch	109 (52.9)
Bassini	2 (1.0)
McVay	4 (1.9)
Shouldice	23 (11.2)
Not specified	7 (3.4)

dictating and operating surgeon. Completeness of intraoperative details ranged from 1.5%–97.1%. The most poorly reported details were occurrence of complications (32.5%) and administration of DVT prophylaxis (1.9%). The most frequently reported details were type of anesthesia (96.6%) and skin closure method (97.1%; Appendix, Table S1).

Hernia-specific details were reported in 8.5%–99.0% of ORs. The most poorly reported detail was the occurrence of the hernia (recurrent or not; 8.5%). The most frequently reported details were the side of the repair (99.0%) and the type of procedure performed (97.1%). Twenty-six (12.6%) reports did not state that the external oblique was closed, and 21 (10.2%) did not specify the type of suture used for repair. Whether the ilioinguinal nerve was identified was dictated in 46.6% of reports and whether the nerve was divided was reported in only 36.4%. The hernia sac was mentioned in 74.8%. Cord exploration was dictated in 32.0%, and identification of cord structures was mentioned in 37.9%. In the ORs of female patients, division of the round ligament was mentioned in 23.5%.

Tension-free repairs (82.5% of repairs) were the most common type of repair performed and were further categorized into prolene hernia system, Lichtenstein and plug-and-patch repairs. The tissue repairs in the audit consisted of the Bassini, McVay and Shouldice repairs. The most common repair was the plug-and-patch method (n = 109), and completeness scores ranged from 36.7% (mention of recreated ring) to 96.3% (reporting tacking of the patch). The prolene hernia system ORs had the highest completeness scores, ranging from 74.3% (mesh was tacked to the inguinal ligament and conjoint tendon) to 97.1% (onlay mesh mentioned). Of the tissue repairs, the most poorly reported was the McVay with no ORs mentioning a transition stitch and no dictations indicating that the conjoint tendon was sutured to the inguinal ligament.

Table 2. Essential elements to be included in the operative report

Element	Completeness; no. (%) n = 206	
Date of operation	200	(97.1)
Date of dictation	206	(100)
Person dictating the operative report	206	(100)
Preoperative diagnosis	191	(92.7)
Procedure (e.g., hernia repair)	200	(97.1)
Side	104	(99.0)
Postoperative diagnosis	187	(90.8)
Surgeon	206	(100)
Sex of patient	184	(89.3)
Occurrence (first repair v. recurrent)	17	(8.3)
Type of repair	197	(95.6)
Cord explored	66	(32.0)
Complications	61	(29.6)
Ilioinguinal nerve block	68	(33.0)
Incarcerated hernia	22	(10.7)

The overall completeness score for essential items was 71.7%, with an average of 10.8 ± 1.3 of essential elements included in dictated ORs. Of the 15 essential items (Table 2), the most poorly reported item was whether the hernia was recurrent (8.3% complete). The individual items ranged from 8.3% to 100% completeness for date of dictation, person dictating and operating surgeon.

Discussion

Narrative reports have traditionally been the standard of care for documenting procedures and examinations performed on patients.[6] In the past decade, studies have shown that these dictations are inadequate and that synoptic reports have been adopted in pathology, radiology, internal medicine, pediatrics and surgery.[1–5,7–14]

In Ontario, Cancer Care Ontario implemented the College of American Pathologists (CAP) standardized checklists for cancer pathology across 14 regional health integration networks in an electronic form with discrete data fields. Srigley and colleagues[15] reported that this implementation was associated with increased completeness rates (39.3% in narrative reports vs. 93.0% in synoptic reports for colorectal tumour pathology). Other studies in pathology have reported similar results with the use of synoptic reports.[8,14] Synoptic reports have also been shown to increase the quality of disability exams,[9] improve quality assurance participation in interventional radiology procedures[10] and improve timeliness and completeness of neonatal discharge summaries.[13] Computerized discharge summaries on medical and surgical services were shorter, contained more information, were faster to generate (at discharge v. up to 26-week delay) and were more likely to be created (98% v. 71%).[7,16] Synoptic reports were found in general to be of similar quality to narrative reports,[16] and they were preferred by general practitioners.[7]

It is not surprising that the synoptic report has been adopted in surgical reporting. Operative reports have been found to be lacking in consistency, quality and completeness and are frequently dictated after a significant delay.[6,17–19] In a study of 250 laparoscopic cholecystectomy ORs, Stewart and colleagues[6] showed that there was a large variation in the content of reports and that key elements, such as adequate dissection of the Calot triangle, were often omitted (present in 24.8% of ORs). Several studies have reported significant delays in the dictation of ORs: 55% were dictated more than 24 hours after surgery in one study[17] and 33% after more than 48 hours in another study.[18] Sixty-seven percent of delayed dictations (> 24h) in a study of resident dictations were noted to be incomplete.[19] Flynn and Allen[17] reported that incomplete description of surgical procedures led to delayed reimbursement in 76% of 550 ORs, which was the equivalent of $1 300 000. In a study of resident dictations by Novitsky and colleagues,[19] 9.7% of 97 ORs had deficiencies accounting for loss of $18 200 of reimbursement if audited. Factors that were identified as affecting the quality of

dictations were the delay between the procedure and dictation, the level of training of the person dictating and lack of awareness of data that are important from medical, medicolegal or scientific standpoints.[19]

Some studies assessing ORs in Mohs micrographic surgery[2] and obstetric/gynecological procedures (including cesarean section, postpartum tubal ligation, total abdominal hysterectomy, vaginal hysterectomy and laparoscopic tubal ligation)[12] have shown improvement in completeness and quality. In general surgery, most studies on OR quality have been conducted in the subspecialty of surgical oncology. One of the early studies, conducted by Edhemovic and colleagues,[3] assessed ORs for rectal cancer surgery. They examined the completeness of intraoperative data reporting, including resection method, clinical margins and node status in standard versus computerized synoptic ORs. They showed that the narrative OR contained 45.9% of the specified data elements with the most important data present in only 33.5%–47.5% of dictations; after development of a web-based synoptic reporting tool, 99% of the data elements were captured.[3] The authors recommended that the synoptic format be adopted as a standard for rectal cancer surgery reporting and serve as an educational tool to remind the surgeon of essential steps of the operation.

In the area of surgical oncology, there have also been publications on synoptic ORs for thyroidectomy, breast cancer procedures and pancreatic resection. The completeness of narrative vs. synoptic thyroidectomy ORs were compared in the study by Chambers and colleagues,[1] where no narrative reports (v. 100% of synoptic reports) contained adequate information to calculate the MACIS (distant metastasis, patient age, completeness of resection, local invasion, and tumour size) score, which is used for prognostication and risk stratification. Essential elements, such as presence of invasion, completeness of resection, and preoperative vocal cord assessment were poorly reported in narrative reports, whereas they were mandatory fields in the web-based template. In a large-scale study on pancreatic resections, synoptic ORs were associated with significantly higher completeness scores, quicker availability in patient charts and good interobserver agreement.[5] The study suggested that electronic synoptic ORs could decrease errors in transcription, reduce costs and provide faster turnaround time. Another study examined the use of a synoptic reporting tool for breast cancer procedures and concluded that the tool was associated with quality improvement, increased efficiency and decreased costs.[4] The study quoted benefits with the new tool, including easy outcomes analysis and assessment of success of breast cancer screening programs, and it also served an ongoing educational purpose. A separate study was conducted on residents' use of computerized synoptic ORs for breast cancers and showed higher completeness scores and better understanding of the operative procedure and perioperative preparations.[20]

Operative reports for common general surgery procedures have not been examined in great detail. To our knowledge, the quality of narrative ORs for IHRs has not been studied to date even though IHRs are among the most common procedures performed by general surgeons. In our own study we reviewed 206 open IHRs dictated by individuals with various levels of training. The completeness scores ranged from 1.9% (DVT prophylaxis) to 100% for individual elements on the checklist. Essential elements were dictated with an inclusion rate of 71.7%. When all elements were considered, however, completeness of ORs scored between 59.2% and 69.0% depending on the level of training of the person dictating the OR. This calculation was limited because of missing data on sex and sex-specific elements. For example, completeness of spermatic cord exploration may have been inaccurately calculated because we included it into the completeness calculation when sex was not specified despite the possibility that the patient could have been a woman. Repair-specific detail scores also varied among the types of repairs. Although our study examined factors such as turnover time for dictation, resident comfort with dictation and cost of dictated reports, our low completeness scores were consistent with those reported in other studies reviewing narrative ORs and showed substantial room for improvement.

The University of Toronto has implemented a synoptic template for laparoscopic cholecystectomy for residents but has yet to conduct a quality study of subsequent dictations. We have yet to develop a web-based synoptic reporting tool, but this is our ultimate goal. The studies we discussed demonstrate that this method would allow real-time entry of pertinent operative information and immediate generation of a synoptic OR for inclusion in the patient's chart upon their transfer out of the operating room, improving communication and continuity of care between hospital teams. The addition of discrete data fields also allows for easy extraction of data for use in quality assessment and for research purposes. Several studies from Alberta have reported success with implementation of a web-based system for oncologic operative reporting (the WebSMR). In a recent publication studying implementation and ease of use of the system, 75% of staff surgeons were moderately or highly satisfied, and 80% said they would recommend the system to surgeons at other sites.[21]

There are important hurdles to changing the status quo regarding dictation of general surgical procedures. These include accessibility and ease of use, privacy issues and technical aspects of implementing a web-based application. There is always a learning curve associated with new tools in health care, and residents and surgeons alike require training on a new system that could be time-consuming in an already busy timetable. Eventually the goal would be for a net decrease in the amount of time required to record operative details in a new system. Privacy issues surrounding personal health information is always an area of concern when a patient's medical record is available on a computer connected to the Internet or intranet. Specific security measures would have to be in place to prevent external or inappropriate access to the synoptic reports. Appropriate consultation with information

technology professionals could be pursued, as most hospitals already have electronic medical records with similar security requirements. Technical difficulties include design of a user-friendly, efficient application requiring close interaction among surgeons, health records and computer programmers. However, there are important potential benefits of implementing a computerized synoptic OR, including decreased transcription costs, faster and greater completion of ORs and prevention of duplication of information on the electronic health record and the electronic OR.

One topic of discussion in studies comparing narrative reports with synoptic reports is the high correlation between the list of essential items and the elements included in a synoptic report. It is possible that the same surgeon provides input into creation of a synoptic report and subsequently participates in the creation of an audit checklist, skewing the results in favour of synoptic reports. To minimize this concern, our checklist for data extraction was based on a consensus committee among a group of academic surgeons at the University of Toronto. In addition, no other validated checklists in the literature nor publications on essential elements of an IHR were available. Neither the initial checklist nor the selection of essential elements were based on precedent evidence. However, one source of bias is that the checklist was created by some surgeons who were also audited in this study.

Limitations

A limitation to our study was the lack of random selection of ORs. The records were all selected in retrospective sequence from a specified date with no randomization for patient parameters, surgical teams or surgical procedure. This led to uneven distribution in the data, especially regarding the location of types of repair; 1 institution carried out most prolene hernia system repairs (27 of 35, 77.1%), and another institution carried out most Shouldice repairs (19 of 23, 82.6%).

Conclusion

Accurate and comprehensive operative notes are essential to patient care, surgeon accountability, resident training and database compilation. Many of the narrative ORs for IHRs are missing key information, and our study suggests there is an opportunity for improvement in the completeness of ORs. One method for improvement lies in standardized synoptic reports, which have been reported to have higher completeness scores and shorter turnover time. Our institution has already initiated synoptic checklists and is in the process of developing a web-based tool for real-time composition of a synoptic operative record.

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Contributors: S. Forbes, C. Eskicioglu, F. Brenneman and R. McLeod designed the study. A Pooni, S. Forbes and C. Eskicioglu acquired the data, which G. Ma, E. Pearsall and R. McLeod analyzed. G. Ma and R. McLeod wrote the article, which all authors reviewed and approved for publication.

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