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Use of a computerized arthroplasty registry to generate operative reports decreases transcription errors

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ABSTRACT

Objectives: Despite the clear importance of the operative report in the electronic medical record, few studies have addressed the quality.
Methods: We prospectively evaluated 300 consecutive patients undergoing primary total joint arthroplasties for operative report errors utilizing three different forms of documentation (standard dictation vs. templated dictation vs. a computer registry database generated operative report). The three types of reports were evaluated for errors which were classified as either major or minor.
Results: There were significantly more total errors in the standard dictation group compared to both the computer registry database generated ($p < 0.001$) and the templated operative reports ($p < 0.001$). Major errors were significantly reduced in the database generated reports compared to the templated ($p < 0.001$) and standard dictation groups ($p < 0.001$). There were significantly more minor errors in the standard dictation group ($p < 0.001$) compared to the other two groups. No statistically significant differences in major errors were noted when comparing standard vs. templated operative reports. There was no difference in minor or total errors between the database generated and templated operative reports.
Conclusions: The use of a computer registry database generated operative report resulted in fewer major errors versus a templated or standard dictated operative report. Further research is warranted in this area to validate these findings across subspecialties and institutions.

1. Introduction

The accuracy of an operative report is vitally important since it conveys all of the pertinent details of the surgical procedure. It is especially relevant in joint replacement surgery as operative reports are frequently utilized in follow-up patient evaluation as well as planning for revision procedures. Operative reports also have an important role in research [1], quality assurance [2], billing [3], and medical-legal issues [4]. The quality of future care delivered may be hampered by poor communication [5].

Despite the clear importance of the operative report in the electronic medical record (EMR), few studies have addressed report quality [3,4,6–11]. Studies from other surgical specialties have shown standardized reports result in more complete and reliable interpretable operative data compared with non-standard operative reports [9]. It is not uncommon to find critical details of operative procedures omitted with unnecessary aspects detailed excessively. A recent study of selective standardized operative dictations in a North American center revealed only 45.9% of consensus criteria could be retrieved from their standardized operative reports [12]. Lastly, delay or losses of revenue secondary to documentation deficiencies have been reported [11]. To our knowledge, medical reporting errors in orthopaedic surgery have not been studied. Therefore, the primary purpose of this study was to evaluate three separate methods of operative report preparation to see if significant differences in errors do exist within varying report generating techniques. We proposed that a computer registry database generated operative report would be more accurate than a standard

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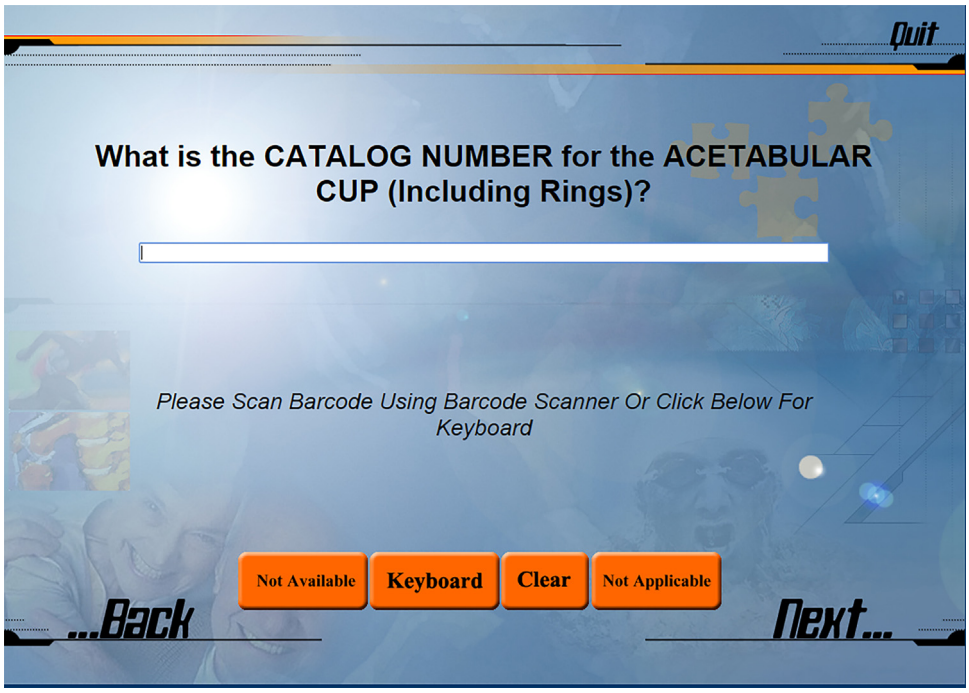

Fig. 1. Implant product barcodes are scanned into the database (Ortech Data Centre, Inc., London, Ontario).

dictated operative report or a report generated from a template-based dictation.

2. Materials and methods

Institutional review board approval was obtained prior to initiation of this study. Current Procedural Terminology (CPT®) v.2015 as maintained by the American Medical Association (AMA) was utilized for coding of each procedure. We prospectively evaluated three groups of operative reports in a single-subspecialty, high volume total knee and hip arthroplasty practice. All three groups consisted of a consecutive series of primary total hip and knee arthroplasty patients. Group 1 was 100 standard dictated and transcribed operative reports. Group 2 included 100 operative reports created from a dictation template. With use of this technique, the surgeon calls into the dictation line and begins by stating "I will be using my total knee arthroplasty template." The surgeon then dictates, "number 1 is. . ." to fill in the numbered blanks according to the template. Group 3 consisted of 100 operative reports produced from entering data into our facility's arthroplasty research database (Ortech Data Centre, Inc., London, Ontario). Data is entered into the computer in the following manner: After each surgical case, the implant product barcodes are scanned (Fig. 1) into the database and surgery specific details (i.e. blood loss, tourniquet time, time preoperative antibiotics are given, preoperative diagnosis, bone loss, intraoperative complications, etc.) are entered via a touchscreen computer (Fig. 2A and B). The implant product barcodes are scanned by a surgical staff member, whereas the surgery specific details are completed by the primary surgeon immediately after the completion of the case. Once the data is entered, an operative report is generated and transferred to the EMR through a program that link the systems.

All of the reports were completed immediately after the surgical case prior to the start of the next case. The reports were distributed evenly by 5 different attending physicians at our institution in this consecutive series. Inclusion criteria included all patients undergoing primary total joint arthroplasty at our institution until 100 consecutive patients in each group were obtained. Exclusion criteria were those patients who did not have a primary hip or knee arthroplasty performed during the data collection period. Additionally, patients were excluded if separate procedures were needed during the primary arthroplasty procedure (i.e removal of hardware).

All operative reports from each group were reviewed for the presence of errors by one of the authors who was not involved in the preparation of the reports. The errors were classified as either major or minor. Major errors included: wrong patient identification (name or ID number), incorrect surgical location or site, omitted data (i.e. assistant name or anesthetic technique), incorrect or missing implant information, or misinformation that could adversely affect patient care (i.e. incorrect blood loss). Minor errors included typographical mistakes of non-critical words, non-critical missing data (i.e. adjective deletion), grammatical, or punctuation errors. Both major and minor errors were totaled for each of the operative report cohorts.

2.1. Statistical methods

Statistical analysis of the data was performed utilizing the Tukey Honest Significant Difference test to evaluate variances in the incidence of minor, major, and total errors amongst the three different types of operative report generation.

3. Results

Group 1, the standard dictation group, demonstrated an average of 22.8 minor errors and 0.86 major errors in each dictation with a range of 0–62 minor errors and 0–4 major errors respectively. Group 2, the template-based group, demonstrated an average of 8.6 minor and 0.79 major errors per report, with a range of 1–21 minor and 0–8 major errors respectively. Group 3, the computer database generated group, showed an average of 8.9 minor and 0.06 major errors per operative report, with ranges from 0 to 3 minor and 5–21 major errors. There was a significantly higher rate of total errors in the dictation group compared to both the computer registry database generated ($p < 0.001$) and the template-