**Hypothesis:** As opposed to the traditional dictated report, the use of a computer-based synoptic operative report will mandate that the surgical resident have a better understanding of all facets of the procedure.

**Design:** A prospective study over a 10-month period.

**Setting:** A 636-bed community teaching hospital.

**Patients:** A total of 57 consecutive patients and 60 operative procedures for breast cancer.

**Main Outcome Measures:** A total of 60 consecutive breast cancer narrative operative reports, dictated by the attending surgeon, were compared with synoptic computerized operative reports filled by an operating resident. It included a total of 36 items containing data on demographics, preoperative history, diagnostic evaluation, and precise intraoperative findings. The 2 types of reports were compared for overall completeness and for the completeness of individual items.

**Results:** Comparison of the narrative and synoptic reports showed that there was significant improvement in data completeness with the use of the synoptic report. The overall analysis showed that the synoptic operating report contained 94.7% of the preoperative and operative data, whereas the dictated operative report was able to capture only 66% of the data ($P < .001$). Eleven of 15 items in the general and preoperative sections of the dictated report and 6 of 21 items in the intraoperative section of the dictated report were underreported compared with the same items in the synoptic report ($P = .004-.001$).

**Conclusion:** The computerized synoptic operative report is superior to the dictated report in the documentation of important preoperative and intraoperative data. Although checklists and templates are not new in medicine, the use of a synoptic operative report as a surgical educational tool is a novel concept. Each resident who participated in our study had to develop a better understanding of the operative procedure in order to complete a more accurate synoptic report.


A NARRATIVE OPERATIVE REPORT is a traditional medical document created by the operating surgeon at the end of a procedure. Currently, surgeons receive American Board of Surgery–mandated training in the perioperative management of the surgical patient. However, no specific teaching is allocated during residency to the preparation of surgical documentation. Consequently, operative reports contain nonstandardized information, and the accuracy becomes a function of the level of resident training.

**See Invited Critique at end of article**

While sections of a dictated operative report are good in documenting perioperative information such as indications for the procedure, type of anesthesia, blood loss, or possible complications, the main description of the procedure itself is highly variable. Dictated reports frequently contain redundant, nonessential information, yet can lack important details. This inconsistency of information becomes important from a patient care standpoint and has implications for data collection for medical research or surgical quality evaluation projects (eg, the Surgical Care Improvement Project and the National Surgical Quality Improvement Project). Template-based summaries are well established in medical documentation. With the development of electronic medical records, templates are increasingly being used by the medical community. Early published data suggest that computerized synoptic operative reports may be superior to traditional dictated reports in document-
After institutional review board approval, our prospective study was initiated, with data collected over a 10-month period. The study was performed in a 636-bed community hospital with a surgical residency program. Breast procedures were chosen for our study because of their relevance to general surgeons and because of the variety of surgical specialists performing those procedures (eg, general surgeons, gynecologists, breast surgeons, and surgical oncologists). After a prestudy review of a number of operative reports and previously published synoptic templates, a total of 36 key items were selected. The operations included breast conservation procedures, mastectomies, sentinel lymph node biopsies, and anatomic axillary dissections.

A computerized drop-down menu program was developed using the Embarcadero Delphi platform (Embarcadero Technologies, San Francisco, California). Additional text boxes were created in the menu to allow free entry when appropriate. Selected items included in the final synoptic report are listed in our Table.

During the study period, both dictated and synoptic reports were prospectively collected. After the completion of each procedure, the attending surgeon dictated the operative report in his or her standard fashion, while the operating resident independently completed the synoptic report. All attending surgeons were blinded to the nature of the study and to the contents of the synoptic report.

To analyze the completeness of dictated and synoptic reports, a database was created using Microsoft Excel 97 (Microsoft Corp, Redmond, Washington). The information contained in both reports was coded in a binary fashion: 1 (present), 0 (absent), or nonapplicable (NA). Items not relevant to particular cases, and not needed to be reported, were excluded from comparison, in order to avoid bias (eg, the item “method of LN excision” was excluded from comparison in the reports in which no lymph node excision took place). Individual items and the overall completeness of dictated reports and synoptic reports were compared using the Fisher exact test. A P value of .05 or less was considered statistically significant.

### RESULTS

During the 10-month study period, both dictated and synoptic operative reports were collected for 57 consecutive patients, who had a total of 60 operative procedures for breast pathology. Of the 60 operative procedures, 57 (95.0%) were performed under the supervision of specialty-trained surgeons, and 3 (5.0%) were performed under the supervision of general surgeons. Junior residents (postgraduate years 1-3) were involved in 34 of the procedures (56.6%), while senior residents (postgraduate years 4 and 5) performed 26 of the procedures (43.3%). The types of breast neoplasms were invasive carcinoma (in 32 procedures [53.3%]), ductal carcinoma in situ (in 10 procedures [16.6%]), lobular carcinoma in situ (in 1 procedure [1.6%]), and intraductal papilloma (in 2 procedures [3.3%]). The remaining 15 procedures (25.2%) were performed for mammographic abnormalities, male breast cancer, Paget disease of the nipple, and phyllodes tumor.

A synopsis of essential operative data extracted from synoptic and dictated reports for selected items is shown in our Table. In the reports’ section containing demographic and preoperative information, the completeness of the synoptic reports was significantly superior to the completeness of the dictated reports in 11 of 15 key data items (P < .001).

In the procedural section of the reports, the completeness of the synoptic reports was significantly superior to the completeness of the dictated reports in 6 of 21 key items (Table). In the remaining items, the completeness of the synoptic reports was not statistically different from the completeness of the dictated reports. The complete-
ness of 8 items (type of surgery, laterality, wire localization, lymph node excision, reconstructive procedure, use of drains, method of closure, and type of dressing) was above 90% in both the synoptic and dictated reports. Six items (result of frozen section and distance of negative margins, number and characteristics of lymph nodes, frozen section of lymph nodes, levels of axillary dissection, and details on preservation of nerves) had completeness above 80% for both the synoptic and dictated reports.

When the 36 items studied were grouped together, the completeness of the synoptic reports was 94.7% (i.e., the percentage of data that was captured), whereas the completeness of the dictated reports was 66.0% \( (P = .001) \). There were no statistically significant differences between the synoptic reports created by junior residents and those created by senior residents \( (P = .02) \).

Some operative details were dictated yet omitted from the synoptic reports, specifically details concerning brachytherapy catheter placement, which began after the midpoint of our study. This addition resulted in 5 cases in which the placement of a breast brachytherapy balloon catheter was not mentioned in the synoptic report by junior residents but was included in 2 synoptic text entries prepared by senior residents.

**COMMENT**

Template-based summaries are not new in medicine. Attempts to replace dictated admission histories and physicals and dictated discharge summaries with electronic forms were repeatedly accomplished in the past. The computerized template reports were more concise, archived essential information, were created efficiently, and were preferred by physicians. With the integration of electronic medical records in US hospitals, template summaries are the new standard. In our own institution, the vast majority of daily progress notes and discharge summaries generated by the house staff are in a computer-generated template format.

Synoptic operative reports are the expected evolution of this trend. Until now, the dictated operative report was the gold standard for the documentation of an operative procedure. It is not without its limitations. The average dictated operative report contains large amounts of nonessential information, while frequently omitting important data. Details such as “abdomen was prepped and draped in the usual fashion” and “wound was closed in three layers” have little reporting value. In addition, a long narrative report with nonessential details that obscure important information makes it difficult to read and onerous to use in research analysis. The value of the dictated operating report as an educational tool for surgical trainees is controversial. Having a resident articulate the steps of a procedure in a succinct fashion would be helpful in learning the conduct of the procedure. This may not be accomplished unless reviewed with the attending physician. Studies indicate that the quality of operative reports dictated by residents is inferior to those dictated by attending physicians. Instruction and experience can improve the quality of the reports; however, most residency programs do not offer dictation training.8-8

The computerized synoptic operative report is a new tool designed to address these issues. A review of the recent literature showed that synoptic reports can be successfully created for multiple standardized operative procedures. Along with being superior to standard operative dictations in reporting important details, they also offer several other advantages. Synoptic reports are easier to create, do not require transcription services, are easy to interpret, and are conducive to data extraction for research purposes and ongoing outcomes analysis.10-13

The purpose of our study was to compare the completeness of synoptic operative reports with the completeness of dictated reports in a setting of a surgical residency program. A secondary goal was to evaluate its educational value in the training of resident surgeons. The unique feature of our study is the controlled, blinded comparison of synoptic operating reports prepared by residents with traditional reports dictated by attending surgeons.

Our results show that the completeness of the synoptic reports prepared by the residents is superior to the completeness of the traditionally dictated reports. Synoptic reports were superior to the dictated reports in 11 of 15 items in the demographic and preoperative sections and in 6 of 12 items in the operating section. For all other items, the synoptic report showed no inferiority to its dictated counterpart.

Several items in the synoptic report provide a significant educational impact. For example, the inclusion of preoperative information such as previous breast history, method of tumor detection, preoperative imaging, tumor location, and clinical status of the lymph nodes ensures better familiarization with the patient. It also reinforces the resident’s understanding of the preoperative decision-making process. Because our tumor registry requires TNM clinical staging for each patient with cancer, synoptic inclusion of these items will potentially improve compliance with the American College of Surgeons Commission on Cancer requirements. Similarly, to fulfill intraoperative data points such as precise location, size of the tumor, use of specimen imaging, results of frozen section, and status of sentinel or axillary lymph nodes requires the resident to further understand key aspects of the procedure.

Unlike the dictated reports, in which the accuracy of the report is a function of the resident’s ability to recall the steps of the procedure, the structure of the synoptic report is designed to prevent omissions of important steps, thus reinforcing the educational experience. This was best exemplified by the midstudy introduction of the placement of a brachytherapy catheter, a step that was not present in the drop-down menu program but could be reported as a free text-box entry. The satisfactory completion of this item was achieved only by senior residents.

Our study has limitations. The items included in the synoptic report were not chosen by consensus but by objectively analyzing multiple dictated reports and available literature. In contrast, consensus-approved menus may be susceptible to a personal or institutional bias.

The built-in flexibility of the synoptic report allows the surgeon to put any information as free text as deemed necessary. The design of the synoptic reports in a hos-
pital's electronic medical records will require the broad multidisciplinary consensus of treating physicians. Additional synoptic items may be included as deemed necessary, such as Surgical Care Improvement Project measures and the use of “surgical time-out.”

Second, although the attending physicians were not aware of the contents of the synoptic reports, they were aware of both the study and the possibility of their operating reports being subjected to scrutiny; hence, some degree of enhancement may have been present (the Hawthorne effect).14

The synoptic operative report is a valuable teaching tool in the education of surgical residents. Documentation aside, this method of reporting enhances a surgical resident’s understanding of the perioperative preparation of a patient as well as the steps in the conduct of a surgical procedure. Through a prospective evaluation, we have shown the synoptic operative report to be complete, reproducible, and conducive to the educational experience. Our residency program is currently evaluating this technique for other resident-generated operative reports. We therefore propose the universal adoption of synoptic operative reporting in surgical training programs as an adjunct to the tradition curricula.

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REFERENCES


INVITED CRITIQUE

Synoptic Operative Reports

Highly Efficient, Questionably Accurate

The study by Gur et al1 compared dictated operative reports by attending surgeons with synoptic operative reports generated by junior and senior residents for 57 breast procedures. The authors concluded that synoptic reports, generated from preselected data points in drop-down menus, are superior both for inclusion of the preselected data points and for resident education.

Gur et al1 clearly demonstrated the superiority of the synoptic report for inclusion of preselected data points. Some of the data points were demographic, easily retrievable from other parts of the electronic record. Others, like nipple and skin excision, may have been omitted by the attending surgeons because they were clearly not part of the operation (e.g., lumpectomy). Had the attending surgeons known the preselected data points...