Operative Reports

Form and Function

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Hypothesis: Little is known about how closely operative reports reflect what was actually performed during an operation, nor has the construction of operative reports been adequately studied with the aims of clarifying the objectives of those reports and improving their efficacy. We hypothesized that if more attention is paid to the objectives of operative reports, their content will more predictably contain the most relevant information, which might channel thinking in beneficial directions during performance of the operation.

Design: Multivariate analysis of 250 laparoscopic cholecystectomy operative reports (125 uncomplicated and 125 with bile duct injury).

Setting: Academic research.

Participants: University (105 cases) and community (145 cases) hospitals.

Main Outcome Measures: Variations in content and design of operative reports. Cognitive task analysis of laparoscopic cholecystectomy was conducted, and a model operative report was generated and compared with the actual operative reports.

Results: Descriptions of key elements in adequate dissection of the Calot triangle were present in 24.8% and 0.0% of operative reports from uncomplicated and bile duct injury cases, respectively. Thorough dissection of the Calot triangle, identification of the cystic duct–infundibulum junction, and lateral retraction of the infundibulum correlated with uncomplicated cases, while irregular cues (eg, perceived anatomic or other deviations) correlated with bile duct injury cases.

Conclusions: Current practice generates operative reports that vary widely in content and too often omit important elements. This research suggests that the construction of operative reports should be constrained such that the reports routinely include the fundamental goals of the operation and what was performed to meet them. Cognitive task analysis is based on the ways the mind controls the performance of tasks; it is an excellent method for determining the extra content needed in operative reports. The resulting designs should also serve as mental guidelines to facilitate learning and to enhance the safety of the operation.

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A N OPERATIVE REPORT IS meant to record the essence of an operation, but little effort has been made to determine how successfully operative reports meet this objective. Furthermore, essence has not been defined with any usable specificity. Research on operative reports so far has addressed its usefulness for billing, determination of differences between what residents and attending surgeons dictate, and specific aspects of the operation such as specimen size, incision length, implants, and suture used. Absent are studies concerning what should be included with regard to achieving the technical goals of the operation and to describing the findings. Also, little attention has been given to the format of the operative report or to its ideal features.

This research examines the features of operative reports for laparoscopic cholecystectomy, a common operation that (although similar among cases) entails variations in important contextual detail and carries the major risk of bile duct injury (BDI). Techniques to help avoid BDIs have been studied in detail, and the mechanisms by which injuries occur are reasonably well understood. The objectives of operative reports deserve more attention so that their content will more predictably contain the most relevant information, an accomplishment that in turn might channel thinking in beneficial directions during performance of the operation. Our objective was to determine how

See Invited Critique at end of article

CME available online at www.jamaarchivescme.com and questions on page 810
Assemble the laparoscopic setup
Create a pneumoperitoneum
Insert the trocars and laparoscope
Prepare the gallbladder for extirpation
Position and prepare the structures so they can be identified
Retract the fundus of the gallbladder cephalad and to the right to expose the hilum and enhance separation of the cystic from the common duct
Pull the infundibulum laterally to fully expose the Calot triangle
Perform a dissection that allows the cystic duct and artery to be seen and identified
Clear away tissue along the medial edge of the infundibulum
Find the cystic artery and isolate it near the gallbladder
Encircle and isolate the cystic duct
Be able to follow the cystic duct visually to ensure that it is in continuity with the infundibulum of the gallbladder
Consider whether an operative cholangiogram should be performed
Main indications are when anatomic variations or anomalies are suspected, when the anatomy is confusing, during especially difficult cases, or to look for common duct stones
Consider whether the abdomen should be opened to complete the operation
Indications may include uncertainty about the anatomy, too much bleeding, the operation not progressing satisfactorily, possible bile duct injury, or other technical complications
Disconnect the gallbladder from its remaining attachments and remove it
Divide the cystic artery and duct
Dissect the gallbladder from its liver attachments
Remove the gallbladder through 1 of the port sites
Tidy up the operative field
Ensure hemostasis
Aspirate residual irrigating fluid
Remove any dropped gallstones
Disassemble the laparoscopic setup and close the incisions

Table 1. Algorithm Based on Cognitive Task Analysis of Laparoscopic Cholecystectomy

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assemble the laparoscopic setup</td>
</tr>
<tr>
<td>2</td>
<td>Create a pneumoperitoneum</td>
</tr>
<tr>
<td>3</td>
<td>Insert the trocars and laparoscope</td>
</tr>
<tr>
<td>4</td>
<td>Prepare the gallbladder for extirpation</td>
</tr>
<tr>
<td>5</td>
<td>Position and prepare the structures</td>
</tr>
<tr>
<td>6</td>
<td>Retract the fundus</td>
</tr>
<tr>
<td>7</td>
<td>Pull the infundibulum</td>
</tr>
<tr>
<td>8</td>
<td>Perform a dissection</td>
</tr>
<tr>
<td>9</td>
<td>Clear away tissue</td>
</tr>
<tr>
<td>10</td>
<td>Find the cystic artery</td>
</tr>
<tr>
<td>11</td>
<td>Encircle and isolate</td>
</tr>
<tr>
<td>12</td>
<td>Be able to follow</td>
</tr>
<tr>
<td>13</td>
<td>Consider whether</td>
</tr>
<tr>
<td>14</td>
<td>Disconnect the gallbladder</td>
</tr>
<tr>
<td>15</td>
<td>Tidy up the operative field</td>
</tr>
<tr>
<td>16</td>
<td>Ensure hemostasis</td>
</tr>
<tr>
<td>17</td>
<td>Aspirate residual fluid</td>
</tr>
<tr>
<td>18</td>
<td>Remove any dropped gallstones</td>
</tr>
</tbody>
</table>

STUDY DESIGN

Cognitive task analysis (CTA) of laparoscopic cholecystectomy was performed that identified the key steps in the procedure (Table 1). The hierarchical structure was chosen for reasons described in the footnote, keeping the objectives (ie, the cognitive issues that drive the actions) separate from the more concrete descriptions of the actions. When devising such schemata, there might be more than 1 way to meet the goal, and excessive dogmatism in prescribing the right-hand (action) entry should be avoided. Using CTA as a guide, a model operative report would include descriptions of the following:

- Retraction of the gallbladder
- Thorough clearance of the infundibulum bordering the Calot triangle
- Identification of the cystic duct–infundibulum junction
- Clipping and cutting of the cystic duct and cystic artery
- Separation of the gallbladder from the liver bed

Dictated operative reports from laparoscopic cholecystectomies were compared with the proposed model operative report that was generated from CTA (Table 1). Operative reports from 250 laparoscopic cholecystectomies (105 university hospital cases and 145 community hospital cases) performed by 152 surgeons were analyzed. The cases comprised 125 without BDIs and 125 with BDIs. The cases without BDIs were from 3 hospitals (1 community and 2 university) and were performed by 28 surgeons, none of whom were residents. Operative reports from this group came from consecutive cases at each of the hospitals. The cases with BDIs were from 116 hospitals (110 community, 4 university affiliated, and 2 university) largely in the western United States and were performed by 124 surgeons. The operative reports were analyzed, and those with and without BDI were compared.

From the operative report, the full text of the procedural description was entered into a database, from which the key aspects of the case were extracted. No attempt was made to read between the lines; the words of the surgeon were the data analyzed. The operative reports were queried for the surgeon’s description of the steps that satisfied the goals of the operation (Table 1).

Any mention of unusual findings was noted, including the presence and number of irregular cues such as abnormal or additional arteries or veins, extra or abnormal bile ducts, abnormal cystic duct (wide or short), abnormal biliary anatomy (intrahepatic gallbladder or abnormal infundibulum), mention of additional structures, fibrous liver bed, abnormal findings on cholangiography, bleeding, visibility issues, or bile in the field. The exact description and the number of irregular cues were tabulated for each case.

STATISTICAL ANALYSIS

Analysis of variance was used for interval parametric data, chi-square test for nominal data, and Pearson product moment correlation or Spearman rank correlation for bivariate comparisons of ordinal and interval data. Factors significant at P<.1 on bivariate analysis were included in the multivariate analysis. Multivariate analysis was performed using a commercially available statistical program (SPSS; SPSS Inc, Chicago, Illinois). The multivariate analyses examined factors associated with the presence of a BDI (BDI vs uncomplicated). The factors included in the model operative report were descriptions of the following: retraction of the gallbladder (fundus and infundibulum), dissection of the Calot triangle and the gallbladder infundibulum, mention of the Calot triangle, complete dissection of the cystic duct–infundibulum junction, whether the cystic duct–common bile duct junction was dissected, whether an operative cholangiogram was obtained, any irregular cues (as already defined), and the total number of irregular cues.
is given in lar cues. The percentage of cases with each key element encountered, bleeding, and the aforementioned irregu-
findings such as inflammatory changes, difficulties separation of the gallbladder from the liver bed, and clipping and cutting of the cystic duct and cystic artery, identification of the cystic duct–infundibulum junction, (4) of the infundibulum bordering the Calot triangle, (3) iden-
tification of the cystic duct–common bile duct junction (1) retraction of the gallbladder, (2) thorough clearance of the infundibulum bordering Calot’s triangle, (3) identification of the cystic duct–infundibular junction, (4) dissection of the gallbladder infundibulum bordering Calot triangle, and (5) routine intraoperative cholangiogram.

A detailed operative report should include descriptions of the following:

- No specifics: “The gallbladder was visualized.”
- No description: “The gallbladder was retracted to the right upper quadrant.”
- Less detailed: “The gallbladder was skeletonized in the standard surgical fashion.”
- Detailed: “We grasped the gallbladder by the fundus and elevated it cephalad and grasped the infundibulum and exposed the triangle of Calot with lateral retraction.”

**Dissection to Identify the Cystic Duct and Artery**

- Less detailed: “After minimal dissection, the cystic duct could easily be seen entering directly into the infundibulum of the gallbladder. The critical angle was viewed. The cystic arteries could also be seen entering directly into the gallbladder.”
- Detailed: “We brushed fatty tissue off the base of the infundibulum; the cystic duct and cystic artery were revealed easily. We spread behind the cystic duct, flipped the infundibulum to the other side, and performed a similar dissection on the back. We could clearly see the cystic duct entering the GB infundibulum, the cystic artery spread on the GB, and the liver edge behind the GB within the triangle of Calot.”

**Operative Reports From 125 Cases Without BDIs**

The text of the operative reports in cases without BDIs from university and community hospitals was similar. Thirty-one operative reports (24.8%) contained what was considered to be a minimum of the desired elements (as previously defined). Twenty of 31 described lateral retraction of the infundibulum, so the proportion with all key elements would fall to 16.0% if this criterion was required. No mention was made of retracting the gallbladder in 21 cases (16.8%). Cephalad fundus retraction was described in 99 cases (79.2%), and lateral retraction of the gallbladder infundibulum was noted in 56 cases (46.4%). Both steps were described in 57 cases (45.6%).

**Table 2.** Bivariate Analysis of Correlation of Operative Report Elements With Bile Duct Injury (BDI)

<table>
<thead>
<tr>
<th>Element</th>
<th>Overall (N=250)</th>
<th>Without BDI (n=125)</th>
<th>With BDI (n=125)</th>
<th>Bivariate P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundus cephalad</td>
<td>157 (62.8)</td>
<td>99 (79.2)</td>
<td>58 (46.4)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Infundibulum laterally</td>
<td>71 (28.4)</td>
<td>58 (46.4)</td>
<td>13 (10.4)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mention of Calot triangle</td>
<td>85 (34.0)</td>
<td>66 (52.8)</td>
<td>19 (15.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Thorough dissection of gallbladder</td>
<td>56 (22.4)</td>
<td>51 (40.8)</td>
<td>5 (4.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Identify cystic duct–infundibular junction</td>
<td>82 (32.8)</td>
<td>55 (44.0)</td>
<td>27 (21.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Identify cystic duct–common bile duct junction</td>
<td>34 (13.6)</td>
<td>11 (8.8)</td>
<td>23 (18.4)</td>
<td>.03</td>
</tr>
<tr>
<td>Routine intraoperative cholangiogram</td>
<td>64 (25.6)</td>
<td>30 (24.0)</td>
<td>34 (27.2)</td>
<td>.56</td>
</tr>
<tr>
<td>Specify no. of clips on cystic duct</td>
<td>206 (82.4)</td>
<td>96 (76.8)</td>
<td>110 (88.0)</td>
<td>.03</td>
</tr>
<tr>
<td>Specify no. of clips in cystic artery</td>
<td>185 (74.0)</td>
<td>80 (64.0)</td>
<td>105 (84.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mention no. with extra tissue beyond tips of clips</td>
<td>11 (4.4)</td>
<td>9 (7.2)</td>
<td>2 (1.6)</td>
<td>.96</td>
</tr>
</tbody>
</table>

**Table 3.** Examples of Verbatim Descriptions Taken Directly From Operative Reports, Chosen to Illustrate the Range of Detail Contained in Surgeons’ Dictations

<table>
<thead>
<tr>
<th>Comment</th>
<th>Excerpts From Operative Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed</td>
<td>“We grasped the gallbladder by the fundus and elevated it cephalad and grasped the infundibulum and exposed the triangle of Calot with lateral retraction.”</td>
</tr>
<tr>
<td>Less detailed</td>
<td>“The gallbladder was visualized.”</td>
</tr>
<tr>
<td>No description</td>
<td>“The gallbladder was retracted to the right upper quadrant.”</td>
</tr>
<tr>
<td>Less detailed</td>
<td>“After minimal dissection, the cystic duct could easily be seen entering directly into the infundibulum of the gallbladder. The critical angle was viewed. The cystic arteries could also be seen entering directly into the gallbladder.”</td>
</tr>
<tr>
<td>No specifics</td>
<td>“The cystic duct and cystic artery were skeletonized and clipped in the standard surgical fashion.”</td>
</tr>
</tbody>
</table>

Abbreviation: GB, gallbladder.

a The categorization of comments as “Detailed” and “Less detailed” was determined per the authors’ judgment.

There are many sources of information about CTA, but we followed the ideas expressed in the *Handbook of Cognitive Task Design* for this work.

**MODEL OPERATIVE REPORT ELEMENTS**

Using CTA as a guide, we judged that the model operative report should include descriptions of the following: (1) retraction of the gallbladder, (2) thorough clearance of the infundibulum bordering the Calot triangle, (3) identification of the cystic duct–infundibulum junction, (4) clipping and cutting of the cystic duct and cystic artery, (5) separation of the gallbladder from the liver bed, and (6) findings such as inflammatory changes, difficulties encountered, bleeding, and the aforementioned irregular cues. The percentage of cases with each key element is given in Table 2.

OPPERATIVE REPORTS FROM 125 CASES WITHOUT BDIs

The text of the operative reports in cases without BDIs from university and community hospitals was similar. Thirty-one operative reports (24.8%) contained what was considered to be a minimum of the desired elements (as previously defined). Twenty of 31 described lateral retraction of the infundibulum, so the proportion with all key elements would fall to 16.0% if this criterion was required. No mention was made of retracting the gallbladder in 21 cases (16.8%). Cephalad fundus retraction was described in 99 cases (79.2%), and lateral retraction of the gallbladder infundibulum was noted in 56 cases (46.4%). Both steps were described in 57 cases (45.6%).

Descriptions of the dissection (Table 3) took the following 3 main forms: (1) notation of thorough dissec-

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tion of the Calot triangle or the gallbladder infundibulum that exposed the cystic duct and artery, (2) an abbreviated account of the dissection, or (3) a simple statement that the cystic duct and artery were exposed.

Fifty-one operative reports (40.8%) described thorough dissection of the infundibulum bordering the Calot triangle (Table 4), 44 (35.2%) contained an abbreviated description of the dissection, and 30 (24.0%) simply stated that the cystic duct and artery were exposed. In 6 cases, the term critical view of safety was used, but there was no further elaboration that clarified what was actually performed in 4 of these cases.

Variations in descriptions of how the cystic duct and artery were clipped ranged from a statement that they were clipped (16 operative reports [12.8%]) to statements of how many clips were placed on either side of the transaction. The number of clips placed was given in 107 operative reports (85.6%). The median number was 6 clips (range, 4-10). Irregular cues were noted in 30 operative reports (24.0%; mean number, 0.5).

OPERATIVE REPORTS FROM 125 CASES WITH BDIs

None of the operative reports in cases with BDIs contained what we perceived to be a minimum of the desired elements. The steps to orient the gallbladder were described in 29 operative reports (23.2%), the word “retracted” was the extent of the description in 36 operative reports (28.8%), “cephalad retraction of the fundus” was the expression used in 58 operative reports (46.4%), and lateral retraction of the infundibulum was mentioned in 13 operative reports (10.0%). The phrase “preferred cephalad retraction of the fundus plus lateral retraction of the infundibulum” was used in 12 operative reports (9.6%).

Five operative reports (4.0%) described thorough dissection of the medial aspect of the infundibulum bordering the Calot triangle. Eighty-one operative reports (64.8%) gave an incomplete account of the dissection. Thirty-nine operative reports (31.2%) simply stated that a dissection was performed and that the cystic duct and artery were identified.

All the operative reports in cases with BDI stated that the cystic duct was divided. In 36 operative reports (28.8%), the cystic duct was said to have been clipped. In the other 89 operative reports (71.2%), the number of clips on the cystic duct and artery was specified (range, 4-15; median, 6). Irregular cues were reported in 100 operative reports (80.0%; mean number of irregular cues, 1.9).

### COMPARISON OF CASES WITH VS WITHOUT BDI

Operative reports for cases with BDI contained fewer key elements than those without BDI, but key elements were missing in most of the uncomplicated cases as well (Table 2). The association of the reported elements with BDI is shown for bivariate (Table 2) and multivariate (Table 4) analyses. On multivariate analysis, adequate dissection within the Calot triangle, identification of the cystic duct–infundibulum junction, and lateral retraction of the infundibulum correlated with uncomplicated cases.

Irregular cues, dissection of the cystic duct–common bile duct junction, and reports of an extra biliary or tubular structure were seen in BDI cases. Irregular cues, noted in 22.2% of cases, were more common in cases with BDI than without BDI (80% vs 24%; P < .001, χ² test). Fewer irregular cues were reported in cases without BDI than with BDI (0.4 vs 2.0; P < .001, χ² test).

### MULTIVARIATE ANALYSIS

On multivariate analysis (Table 4), elements of operative reports that correlated with uncomplicated laparoscopic cholecystectomy were lateral retraction of the infundibulum, thorough dissection of the medial surface of the infundibulum, and identification of the cystic duct–infundibulum junction. Elements of operative reports that correlated with BDI included absence of these elements, notation of an abnormal or additional bile duct, dissection of the common bile duct–cystic duct junction, and description of irregular cues.

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### Table 4. Multivariate Analysis of Correlation of Operative Report Elements With Bile Duct Injury (BDI)

<table>
<thead>
<tr>
<th>Element</th>
<th>Without BDI (n=125)</th>
<th>With BDI (n=125)</th>
<th>Bivariate P Value</th>
<th>Multivariate P Value</th>
<th>Odds Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundus cephalad</td>
<td>99 (79.2)</td>
<td>58 (46.4)</td>
<td>&lt;.001</td>
<td>.08</td>
<td>0.79 (0.89 to 1.67)</td>
</tr>
<tr>
<td>Infundibulum laterally</td>
<td>58 (46.4)</td>
<td>13 (10.4)</td>
<td>&lt;.001</td>
<td>.01</td>
<td>1.4 (0.32 to 2.47)</td>
</tr>
<tr>
<td>Thorough dissection of gallbladder infundibulum bordering the Calot triangle</td>
<td>51 (40.8)</td>
<td>5 (4.0)</td>
<td>&lt;.001</td>
<td>.001</td>
<td>2.3 (0.82 to 3.77)</td>
</tr>
<tr>
<td>Identify cystic duct–infundibular junction</td>
<td>55 (44.0)</td>
<td>27 (21.6)</td>
<td>&lt;.001</td>
<td>.008</td>
<td>1.5 (0.39 to 3.55)</td>
</tr>
<tr>
<td>Mention of the Calot triangle</td>
<td>66 (52.8)</td>
<td>19 (15.2)</td>
<td>&lt;.001</td>
<td>.11</td>
<td>...</td>
</tr>
<tr>
<td>Abnormal routine cholangiogram</td>
<td>2/30 (6.7)</td>
<td>25/34 (73.5)</td>
<td>&lt;.001</td>
<td>.10</td>
<td>...</td>
</tr>
<tr>
<td>Bleeding</td>
<td>9 (7.2)</td>
<td>32 (25.6)</td>
<td>&lt;.001</td>
<td>.29</td>
<td>...</td>
</tr>
<tr>
<td>Identify cystic duct–common bile duct junction</td>
<td>11 (8.8)</td>
<td>23 (18.4)</td>
<td>.03</td>
<td>.002</td>
<td>−1.8 (−3.1 to −0.46)</td>
</tr>
<tr>
<td>Additional or abnormal bile duct</td>
<td>1 (0.8)</td>
<td>33 (26.4)</td>
<td>&lt;.001</td>
<td>.03</td>
<td>−2.7 (−5.1 to −0.29)</td>
</tr>
<tr>
<td>Irregular cues, mean No. (range)</td>
<td>0.4 (0.0-4.0)</td>
<td>2.0 (0.0-6.0)</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>−1.1 (−1.8 to −0.50)</td>
</tr>
</tbody>
</table>

Abbreviation: ellipses, not applicable.
In today’s world, as the complexity of work increases, so do the cognitive demands on humans within the systems. Simple descriptions of what is manually performed by humans fail to capture important cognitive (abstract) considerations such as the intermediate and higher-order objectives that are meant to be satisfied.

To elucidate how the human mind functions as it performs complex tasks such as an operation, cognitive psychologists have created a model in which cognitive activity is divided into 2 levels, an action level and a controlling meta-level (Figure). The executive meta-level guides the action using feedback from the action level so that the goals of the procedure will be met. To do this, the meta-level constructs a dynamic model of the action level and integrates knowledge, goals, strategies, and progress. Accuracy of the model is critical to decision making because the performance of the mind is model based, which might lead to errors if that model was an inaccurate representation of reality. Scarce attentional resources are allocated to features of the operative field based on their perceived priorities. Because the focus of visual attention spans a mere 2.5° and because the progress of the action attracts most of the attention, less important items within the field of view inevitably go unattended. As argued herein, this psychological model of the human mind is an appropriate artifact on which to base improvements in the design of operative reports.

The increasing complexity of work, coupled with the changing roles of humans in systems, led in recent decades to the development of CTA, hierarchical task analysis, and cognitive task design as superior ways to conceptualize activities because they bring to the fore the meta-level concerns at the heart of procedures. Algorithms depicting such analyses for complex systems are often themselves complex, but this is not the case when CTA is used to describe a laparoscopic cholecystectomy or other operations. It is straightforward in this setting, and the results provide a valuable perspective on the work.

In addition to providing a more reliable record of an operation, CTA should aid decision making in the operating room. By framing the thinking of the surgeon, it is expected to enhance the chances of the desired result, namely, a complication-free operation. In a useful summary, Stanovich notes that 2 kinds of rationality are involved in human decision making, epistemic and instrumental. This translates into thinking based on what is true (epistemic) and on what to do (instrumental). The cognitive parts of CTA in Table 1 support both. What is true in this case refers to the meta-level model of the anatomy and the significance of disconfirmatory findings (eg, irregular cues). What to do refers to the technical strategy that optimizes the chances of avoiding, for example, misidentification of the common duct for the cystic duct, the error underlying most BDIs (class III injury).

Expectations of better results from psychological efforts like this are well supported empirically. Explicit delineation of the goals, which is a central objective of task analysis, greatly increases the chances that they will be attended to and addressed during the performance. The fact that the operation precedes dictation of the operative report is not an obstacle because the desired content of the operative report would be continually rehearsed during training and previous practice if this approach was part of a program that redesigned operative reports.

Cognitive task analysis as summarized in Table 1 describes the most common technique for laparoscopic cholecystectomy, which consists of clearing the connective tissue at the base of the gallbladder to identify the cystic duct and artery and preparing them for transection. It is the strategy recommended by the Society of American Gastrointestinal and Endoscopic Surgeons, for example. This technique was a modification of the top-down method of performing an open cholecystectomy, which verified the identity of the cystic duct by following the tissue plane on the gallbladder surface. It was adapted for laparoscopic surgery by leaving the gallbladder attached to the liver, while performing the same kind of infundibular dissection.

The first part of the present study consisted of consecutive operative reports from 1 community hospital and 2 university hospitals, collected in a way such that their contents could not have been influenced by the project, which was not conceived until after the dictations had been performed. The surgeons at these 3 hospitals were not so closely related that their practices would spontaneously harmonize, so we are confident the findings reflected the habits of a wide segment of laparoscopic surgeons. The most striking observation was the variability of the operative reports across 29 surgeons (Table 3). The operative reports from individual surgeons were more similar, but some were characteristically dictated in substantial detail and others were more cursory within each of the hospitals.

There was no apparent relationship between the level of difficulty of the operation and the extent of the descriptions of the key elements. Because almost no instruction is given to newly minted surgeons regarding what to include and what to exclude in operative reports (eg, “tell them what you saw and what you did”), this variability was anticipated. The data support the conclusion that there is no consensus regarding what to say, much less a firm belief that a specifiable minimum is called for in every case.

Our data suggest that when a surgeon dictated a specific technical step, it was likely that the step had actu-
ally been performed. Consequently, when the surgeon claimed that thorough dissection was made laterally and inferiorly in the Calot triangle, there were fewer complications than when such a description was absent. On the other hand, there was no basis for thinking the dissection was necessarily incomplete in cases where it had not been thoroughly described.

With few exceptions, the occurrence of a BDI in a surgeon’s practice is an isolated event and has been preceded by many hundreds of uncomplicated cholecystectomies. Therefore, BDIs do not seem to result from chronically inferior operative strategies. However, the data from the present analysis contain no information about the contents of the operative reports from the previous uncomplicated cases of the surgeons who performed the complicated cholecystectomies.

By necessity, operative reports contain a fraction of everything that occurs. Our data show that the step (in the operative report) that most separated the complicated cases from the uncomplicated cases was a description of a complete dissection of the lateral and inferior regions of the Calot triangle (i.e., the medial surface of the gallbladder infundibulum and the superior margin of the cystic duct). This raises the question of whether inclusion of more information in the operative report might somehow protect the surgeon from the complication. When the key technical maneuvers were thoroughly described in operative reports, there were fewer BDIs. According to this thinking, operative reports reflect the events thought to be most important to the surgeon. The mindset of the surgeon determines the technical outcomes. The elements included in the operative report reflect their perceived salience compared with the many other things that were performed and seen but not mentioned.

The preceding remarks have addressed the need to better document meta-level considerations in operative reports. Improving the operative record at the object level is not the subject of this article, but existing imaging technology could make substantial contributions if the operative field was photographed periodically throughout the procedure and the images were stored along with the verbal operative record. This would make surgical record keeping similar to that in radiology, where findings of fluoroscopic examinations are preserved in static images.

An operative report is dictated, not written, and as such it is a narrative. Research suggests that narrative generation conjures up a mental image of the event, and it involves areas in the brain devoted to visuospatial imagery. Narrative is handled differently by the brain than are a few written words or short sentences. Certain areas of the brain uniquely process narrative, while others process sentences and words. When a physician reads a narrative description, it likely activates visual processing centers.

Supplanting a narrative operative report with a predetermined template, as some have recommended, would result in the loss of important information such as the irregular cues reported in many of the BDI cases. One study in which the contents of operative reports were prescribed by templates showed that important context was lost compared with operative reports dictated in the absence of restrictions on the amount of free text. Narrative is also known to be important to sense making and to decision making. The model operative report (Table 2) devised in this experiment is not held out as necessarily complete or perfect. It has not yet been embodied in programs that prescribe the ingredients of operative reports for laparoscopic cholecystectomies at our institutions, and we anticipate that attempts to implement such programs may uncover reasons to expand the protocol. Nevertheless, the available data provide strong support to the idea that important benefits would accrue from continuing in this direction.

Our conclusions are several. Without a modern theory governing their role and structure, operative reports dictated by competent surgeons vary widely and unpredictably. In addition to being flawed records, they weakly recount the technical goals and strategies of the operative procedure. We propose using CTA as a conceptual tool to rectify these shortcomings. Finally, we caution against the temptation to embrace a template model for creating operative reports because this shorthand method inappropriately ignores contextual background, and important information is certain to be lost. Our recommendations would require a small amount of extra discipline, but they should substantially increase the value of operative records.

We predict 6 desirable effects of CTA-based operative reports. (1) Such operative reports provide a better way to conceptualize the steps involved in accomplishing a task. (2) They simplify the method of teaching learners how to perform operations. (3) Their content better elucidates the crucial cognitive demands of the manual work. (4) They bring modern methods of task design into surgery. (5) The format is applicable to all types of operations. (6) Finally, CTA-based operative reports should aid in the detection and understanding of performance deviations associated with technical complications.
stewart et al constructed a “model” operative report for laparoscopic cholecystectomy using cognitive task analysis. With this technique a complex procedure can be decomposed into sequential goals, and within each goal the most effective actions needed to accomplish it are identified. Using this technique they described in an orderly and accurate fashion all aspects of laparoscopic cholecystectomy, creating a model report. The authors compared the content of this model operative report to that of 125 operative reports of laparoscopic cholecystectomy regarding patients who had no BDI during the operation and that of 125 operative reports regarding patients who had sustained such an injury. This work can be examined from 3 perspectives: (1) the accuracy of an operative report to reflect the actions that were actually performed; (2) the relationship between findings and technique (as described in the report) and the occurrence of a BDI; and (3) the potential for the operative report to become a tool to improve the safety of the operation.

With regard to the first perspective, the authors clearly showed that most operative reports lack 1 or more descriptors of the precise tasks one would expect in an ideal report (such as the model). This finding occurred with alarming frequency in reports of both groups of patients—more so among those who had sustained a BDI. Thus, they demonstrated that most reports provide only a general description of the operation but cannot be relied on to define each of the tasks associated with the procedure. They acknowledge that the absence of a descriptor does not necessarily mean a certain step or maneuver was not performed. Nevertheless, they clearly showed that in this regard, our system is not good enough, that dictation of operative reports as currently performed in

Making Surgery Safer

Can the Operative Reports Help?


