A surgical team with focus on staff education in a community hospital improves outcomes, costs and patient satisfaction


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KEYWORDS: Outcomes; Costs; Patient satisfaction; Surgical education

Abstract

BACKGROUND: Outcomes, decreased costs, and patient satisfaction are the driving forces of a successful surgical practice.

METHODS: A surgical team was assembled on October 1, 2010, and educational sessions were implemented. The outcomes and costs for patients who underwent laparoscopic fundoplication and Heller myotomy before and after October 1, 2010, were compared. A Press Ganey patient satisfaction survey was mailed to all patients.

RESULTS: There were 268 procedures (103 before and 165 after October 1, 2010): 64 laparoscopic fundoplications and Heller myotomies (23 before and 41 after). There were significant reductions in median operating time (185 minutes [interquartile range {IQR}, 155 to 257 minutes] vs 126 minutes [IQR, 113 to 147 minutes]; \( P = .001 \)), length of stay (2.0 days [IQR, 2.0 to 4.0 days] vs 1.0 day [IQR, 1.0 to 2.5 days]; \( P = .05 \)), operating room costs ($2,407 [IQR, $2,171 to $2,893] vs $2,147 [IQR, $1,942 to $2,345]; \( P = .004 \)), and hospital room costs ($937 [IQR, $799 to $2,159] vs $556 [IQR, $484 to $937]; \( P = .044 \)). The survey showed significant improvements in patients’ experiences in communication with nurses (\( P = .025 \)), pain management (\( P = .000 \)), communication about medications (\( P = .037 \)), and discharge instructions (\( P = .024 \)).

CONCLUSIONS: Assembling a surgical team with focus on staff education has a significant impact on outcomes, costs, and patient satisfaction.

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Outcomes, decreased costs, and patient satisfaction are the driving forces of a successful surgical practice. The advancing age of patients coupled with steadily increasing acuity has resulted in an urgent need to deliver efficient, high-quality, and low-cost health care. As important as these elements are in daily surgical practice, methods for how to improve these metrics had previously remained unclear. The aim of this study was to assess improvements in outcomes,
costs, and patient satisfaction in a community hospital as a result of assembling a surgical team focused on staff education.

Methods

A prospective study was conducted to assess the impact of assembling and educating a surgical team on outcomes, costs, and patient satisfaction in a 267-bed community hospital (1 of 11 linked hospitals in a metropolitan American city). The study population included all patients who underwent thoracic and foregut procedures from August 1, 2009, through May 31, 2012. A team of inpatient nurses (n = 32), respiratory therapists (n = 8), physical therapists (n = 6), nutritionists (n = 2), circulating operating room nurses (n = 3), scrub technicians (n = 3), surgical assistants (n = 2), anesthesiologists (n = 2), and a surgeon (n = 1) was assembled on October 1, 2010. Monthly teaching sessions with the staff, monthly multidisciplinary conferences, weekly meetings with team leaders, and daily patient rounds by the surgeon and bedside nurses were implemented. The outcomes and costs for patients who underwent laparoscopic fundoplication for hiatal hernia and laparoscopic Heller myotomy for achalasia before and after the team was assembled were compared. A Press Ganey patient satisfaction survey was mailed to all patients who underwent thoracic and foregut procedures, and the results before and after the team was assembled were compared. The study was approved by the institutional review board of our institution.

Weekly meeting with team leaders

A weekly meeting was organized with the team leaders from each key area of practice, including physical therapy, respiratory therapy, radiology, endoscopy, nutrition services, managers of the telemetry unit, the intensive care unit, and the operating room. The meeting was used to review the surgical cases for the upcoming week and allow optimal communication before the patient’s arrival. Any special needs were identified, and high-risk patients were discussed in detail. The issues and concerns from the previous week were reviewed, and the processes that required improvement were identified. A plan for improvement, with input from all team members, was initiated, and the feedback and results were evaluated at the following meeting.

Methods to decrease operative time and operating room direct costs

A generic copy of each operative procedure was placed in a binder as a teaching aid for the intraoperative staff. The instruments, sutures, and required materials were recorded on a preference card according to the order of use during the surgical procedures and placed in the training binder. All necessary materials were pulled before each case to minimize the wasted time, enabling the circulating nurse to remain in the room as much as possible.

Methods to decrease length of stay and hospital room direct costs

During the preoperative assessment visit, patients were instructed on the method of use and importance of the incentive spirometer in the postoperative care. The use of the incentive spirometer was reinforced and encouraged consistently throughout the patients’ stays both by nurses and by respiratory therapists. Patients were immediately weaned from oxygen after surgery. The respiratory therapists then implemented chest physical therapy with inhalers immediately after surgery, every six hours, and as needed. Early ambulation was implemented by the physical therapists on the day of the surgery. Adequate pain management was achieved as explained in the “Pain Management” section of this article. Patients were given clear liquids for breakfast and full liquids for lunch. Once the diet was well tolerated and adequate pain control was achieved on oral pain medications, patients were discharged home after lunch. The discharges were expedited as soon as patients were ready to be released.

Methods to improve patient satisfaction

After surgery, the surgeon met with the family members in a private consultation room to discuss the procedure, postoperative care, and the estimated length of stay. The critical elements of the postoperative care plan, including the importance of early ambulation, pain control, use of the incentive spirometer, and chest physical therapy, were emphasized with family members. All patients in this study were admitted to a designated telemetry unit in private rooms, where they were constantly monitored. The environment was calm, quiet, and clean. The call light was accessible to patients, and they were assured that the staff was available to address their needs at any time. The patients were attended only by the specially trained members of the surgical team. Patients were immediately evaluated by the surgeon in both the postanesthesia care and telemetry units. An explanation of how the surgery went was provided to the patients in understandable terms, and their pain levels and surgical sites were assessed. Patients were seen by a nutritionist on the day of surgery to review their diets for the following day and to answer questions. A patient-friendly nutrition handbook was given to patients and reviewed by the nutritionist. Other nursing aspects of patient care, including pain management and discharge instructions, are explained later.
private rooms proximal to one another and were assigned to a single nurse on each shift, both on the day of surgery and on the days that followed. Monthly interactive educational sessions were provided for the nurses whereby the steps of the respective surgery, postoperative care, and potential side effects and complications were reviewed. Daily team rounds by the surgeon and nurses were implemented in which the nurses provided a systematic report and lab and radiologic results. Any change in the plan of care was explained to the nursing staff so that they could make necessary adjustments in their care delivery. At the end of the rounds, patients were given the opportunity to ask questions and notify the team if there was anything else that could be provided.

A “patient interaction assessment” sheet was prepared to instruct and validate nurses on how to establish an ideal connection with patients, communicate effectively, and address all of the patients’ needs with each interaction (Fig. 1). Nurses were evaluated by the manager of the telemetry unit three times per month during real-time interactions with the patients. The evaluation sheet was reviewed by the manager with each nurse, and a plan to improve their performance was established. Their strengths were reinforced and encouraged, while points for improvement were discussed in an interactive fashion. Postdischarge calls were made one day after surgery by the manager of the telemetry unit to check on the patients and ask about their experience during the hospitalization.

**Physician’s communication with patients.** During the initial clinic visit, after active listening to patients and a physical exam, all the necessary preoperative workup, including manometry, video esophagram, esophageal pH monitoring, and endoscopy were fully explained to the patients and their family members in simple language. Fact sheets were designed and used to help explain the process and diagnostic procedures, including the potential risks, benefits, and side effects. Once the diagnostic evaluation was completed, the results were carefully reviewed during a follow-up visit with the surgeon. To improve understanding of the procedure, simple schematic color drawings detailing each step of the indicated procedure, which were designed at our center, were reviewed with the patients. The risks and the benefits of the procedure were discussed in detail. Patients were not only given an opportunity to ask questions but were encouraged to do so before informed consent was obtained. A patient-friendly nutrition handbook was developed and given to the patients. The handbook
contained clear definitions of different diet types and examples of specific foods in each diet. A trained clinic nurse was present during the entire interaction with the patient, as discussed later. All patients were seen on the day of surgery in the preoperative area, and final questions were answered.

Daily rounds by the surgeon and nurses on each patient were implemented. The surgeon made time to sit down during each inpatient visit. All aspects of care, including laboratory and chest x-ray results, were reviewed with patients and their family members, and all questions were answered.

On the day of discharge, clear and concise instructions were provided directly to patients and their family members by the surgeon, as explained later. Postdischarge calls were made 1 day after discharge by the surgeon’s office to check on the patients and ensure their well-being.

Nurses’ communication with patients about medications. A standard postoperative order protocol that included medications for pain, antibiotics, and deep vein thrombosis prophylaxis was implemented. Nurses were educated about medications that are used routinely after surgery, and they effectively taught patients about them, including their purposes and side effects. The importance of clear explanation about medications was emphasized to the nurses during the educational sessions and daily rounds.

Pain management. To achieve adequate pain control, skin incisions were anesthetized before they were made and again at the end of the case using plain bupivacaine .5%. Intravenous ketorolac 30 mg was given at the time of extubation and continued at 15 mg intravenously every six hours for 24 hours. Intravenous morphine or hydromorphone was given as needed to achieve complete pain control. On postoperative day 1, ketorolac, morphine, and hydromorphone were stopped and hydrocodone/acetaminophen elixir was given orally. Pain was reassessed continuously by nurses making rounds on an hourly basis to ensure adequate pain control. If patients were allergic to codeine, ibuprofen or acetaminophen elixir was given. If a patient used the call bell to request pain medication, the nurse responded promptly, in most cases in <5 minutes. It was strongly emphasized by the nursing leaders in the telemetry unit that pain should be assessed in a proactive manner and that medications should be given before the patients’ pain escalated. The nurses were instructed to call the physician at any time if the medication prescribed seemed to be inadequate.

Discharge instructions. A standard discharge instruction sheet was developed and provided to each patient (Fig. 2). The sheet contained instructions about routine activities such as showering or bathing, driving, removal of dressings, pain medications, how medications should be taken, signs and symptoms of infection or other potential complications, when they should call the physician, a phone number to reach the physician if problems occurred, and a follow-up clinic date. Discharge medications were called into the pharmacy and made available before the patients were discharged. Patients or their family members were asked to read the discharge instructions aloud in the presence of the surgeon and a nurse. If all discharge instructions were clear, the patient would sign the discharge instructions. Otherwise, time was spent further explaining and answering questions. A copy of the discharge instructions was given to the patient, and 1 copy remained in the patient’s chart. Postdischarge calls were made 1 day after discharge by the surgeon’s office to ensure that patients were doing well and by the manager of the telemetry unit to check on them and ask about their experiences during hospitalization.

Statistical analysis

Data for this study were divided into two types: continuous variables and categorical variables. Continuous variables are presented as means and medians (including interquartile ranges [IQRs]). Statistical differences in means before and after implementation of the surgical team were analyzed using two-sample t tests, while differences between medians for the two groups were analyzed using Mood’s median test at the 95% confidence level. Statistical differences between the categorical variables (displayed as the total number or frequencies) were analyzed using chi-square tests. Differences in outcomes were considered significant with P values < .05. Matching and statistical analyses were performed using Minitab version 16.1.0.0 (Minitab, State College, PA) at a significance level of P < .05. Financial and procedure coding data were obtained using a cost accounting system (Allscripts versions 7.2.93.10341; Allscripts Health Solutions, Inc, Chicago, IL). Operating room statistics were captured using SurgiNet (Cerner Corporation, Kansas City, MO). Patient satisfaction data were obtained using the Press Ganey Satisfaction Performance Suite (Press Ganey Associates, Inc, South Bend, IN) software package.

Results

Data are presented as medians and IQRs. The team was assembled on October 1, 2010. From August 1, 2009, through May 31, 2012, a total 268 inpatient thoracic and foregut procedures (103 before and 165 after the team was assembled) were performed. There were 64 laparoscopic fundoplications and Heller myotomies (23 before and 41 after the team was assembled). There was no difference in the ages of the 64 patients who underwent laparoscopic fundoplications and Heller myotomies before and after the team was assembled: 55 years (IQR, 42 to 72 years) versus 55 years (IQR, 46 to 61 years) (P = .94).

There were significant reductions in operating time (Fig. 3), length of stay (Fig. 4), direct operating room–related costs (Fig. 5), and hospital room–related costs.
(Fig. 6) from before to after the team was assembled. A Press Ganey patient satisfaction survey was mailed to all 268 patients who underwent inpatient thoracic and foregut procedures. Results were received from 55 of 268 patients (21%), 16 of 103 (16%) before and 39 of 165 (24%) after October 1, 2010. Survey results showed significant improvements in overall rating ($P = .049$), patient experiences in communication with nurses ($P = .025$), pain management ($P = .000$), communication about medications ($P = .037$) (Table 1), and discharge instructions ($P = .024$) (Fig. 7) after the team was assembled.

**Comments**

The results of our study show that organizational change can be achieved in a community hospital through close collaboration among all involved health care providers but, most important, between the surgeons and nurses. Decreased costs and improved outcomes as a result of collaborative work between surgeons and nurses has been shown in other disciplines, such as cardiac surgery, in which cardiac surgeons and nurse practitioners have worked together to deliver care.1

Patient satisfaction is an important measure of quality of care that can contribute to a balanced evaluation of the structure, process, and outcomes of surgery. The assessment of patient satisfaction provides important feedback on how patient care (or patients’ perception of care) can be improved. With the focus on this measure by Centers for Medicare and Medicaid Services, patient satisfaction has also become an increasingly important focus for health care organizations. Hospital patient satisfaction scores will have a direct impact on health care reimbursement, which will be determined by how patients rate their hospital experiences on the Hospital Consumer Assessment of

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**Figure 2** Discharge instructions.
Healthcare Providers and Systems patient satisfaction surveys.

It is crucial to analyze which aspects of the health care experience provide the highest satisfaction to surgical patients and to identify organizational features contributing to quality, outcomes, and patient satisfaction. In a study of 2,699 surgical patients discharged from 26 hospitals in Europe, a survey administered via mail showed that the strongest predictors of patient satisfaction were interpersonal interaction with medical practitioners and nurses and the level of organization of operations, including admission, discharge and length of stay. Other studies have shown that patient satisfaction in surgical practice is influenced by the amount of information given to patients, most importantly, the informed consent and the discharge instructions. Patients’ perceptions of the quality of care can directly affect overall satisfaction, beginning with the first clinic visit, at which the initial interaction between a patient and a surgeon is established. One of the important factors contributing to patient dissatisfaction in a surgical population is lack of understanding of informed consent and associated potential complications. In a study of 1,514 questionnaires returned by surgical patients for 39 surgeons in the United States, the following communication lapses were reported: failure to ask whether the patient had questions, failure to sit down, use of words patients could not understand, failure to educate patients about their conditions, failure to introduce themselves, lack of interest in patients as people, and inadequacies in answering questions. It is important for surgeons to spend adequate time to clearly describe the steps of an operation, including the risks and benefits, in simple language. It is equally important for patients to have all their questions answered to obtain informed consent. We found that providing a simple schematic color drawing of the steps of the surgery was well received by patients and allowed them to have a better understanding of the procedure.

Surgeon-patient interactions are only part of a patient’s overall experience and satisfaction during hospitalization. Interactions between patients and all other health care providers, especially nurses, also play an essential role. It has been shown that care provided by nurses with higher degrees of nursing education can affect quality and outcomes in surgical patients. A cross-sectional analysis of outcomes data for 232,342 general, orthopedic, and vascular surgery patients discharged from 168 hospitals in...
the United States showed that in hospitals with higher proportions of nurses educated at the baccalaureate level or higher, surgical patients experienced lower mortality and failure-to-rescue rates. The ability of nurses to adequately educate patients and answer questions in a reassuring manner can significantly influence patient satisfaction. Nurses spend much more time with patients than other team members. Therefore, their knowledge and understanding of every aspect of care, including procedures, medications, and critical elements of postoperative care, are essential for achieving desired outcomes. Education for nurses should be initiated at the clinic visit so that the clinic nurses learn about the process of decision making, indications for surgery, and potential risks of procedures. Education and training should then be continued with inpatient nurses during daily rounds at which laboratory and imaging results are reviewed by the surgeon with nurses, patients, and their family members. Well-coordinated daily rounds allow continuous learning for nurses while providing informative sessions for patients. Monthly focused educational sessions and weekly meetings with nursing team leaders can further reinforce nurses’ knowledge about surgical procedures and potential complications and equip them to better anticipate the specific needs of their patients. Nurses’ communication with patients about medications can be improved by providing standard postoperative order protocols and teaching nurses about various postoperative needs of patients, such as pain management, deep vein thrombosis prophylaxis, and the use of antibiotics. Postoperative pain management is extremely important in patient recovery. There are several barriers to effective postoperative pain assessment and management in surgical patients, including inadequate dosing of medications and staffing shortages or heavy workloads, which can prevent nurses from assessing and administering medications in a timely manner.

### Table 1

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<th>October 1, 2010 to May 31, 2012 (20 mo)</th>
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<td>16/103 (16%)</td>
<td>39/165 (24%)</td>
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<td><strong>Overall rating (mean) (scale, 1–10)</strong></td>
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<td><strong>Communications with nurses</strong></td>
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<td><strong>Communication about medications (%)</strong></td>
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![Figure 7](image_url)
manner. In an effort to eliminate these barriers, surgeons and nursing leaders should collaborate to establish the framework by which nursing care delivery expectations are established and followed. This study has shown that educating nurses on how to interact with patients and address their pain during the postoperative period has a significant impact on patient satisfaction.

Another important educational focus for the team was the importance of early mobilization and weaning from oxygen, which in addition to adequate pain control were key drivers in expediting recovery and decreasing the length of stay in this study.

Discharge instructions and continuity of care after discharge are important elements in achieving patient satisfaction. This study has demonstrated that a simple discharge sheet with clear explanation of patients’ needs after discharge, which is reviewed by the surgeon with the patients and nurses before the patients leave the hospital, can improve patient satisfaction. We believe that asking patients or their family members to read the discharge instructions aloud in the presence of the physician and discharging nurse can help improve patient understanding, especially when they are given an opportunity to ask questions afterward. Reviewing this sheet can take <10 minutes, but it can have a major impact on a patient’s posthospital care and satisfaction. Postdischarge calls 1 day after discharge by the surgeon’s office and the manager of the telemetry unit to check on patients and ensure that they were doing well were positively received by patients. A patient-friendly nutrition handbook to teach them what to expect and how to advance their diets after discharge helped clarify and set expectations for the progression of their diets and proved beneficial in their levels of satisfaction with their overall care.

Our study shows that education of the surgical staff not only can affect patients’ care and satisfaction but can also improve flow and time management during surgery. Efficiency in the operating room seems to directly relate to the knowledge of the operating room staff regarding the steps of procedure. Providing operative reports and preference cards that are organized chronologically in the order of use can decrease the duration of the operation and overall costs of the operating room as a result of less operative time and less wasted instruments and surgical materials.

There were no residents in our hospital, but our study shows that the concept of the surgical team, which can include residents, may potentially improve efficiency and decrease costs in academic practices. Patient satisfaction can improve by having standardized protocols in teaching facilities. In addition, assembling a surgical team that includes residents will improve residents’ education regarding patient care, cost, and efficiency. This practice will allow chief residents to develop their leadership skills, learn about collaboration with other health care providers at early stage of their careers, and prepare them for future surgical practice in our evolving health care system.

Conclusions

Assembling a surgical team with a focus on staff education can result in an organizational change in a community hospital that appears to have a significant impact on outcomes and patient satisfaction, while decreasing costs. This change requires the leadership of the practicing surgeon and collaboration among all health care providers involved. The most critical element is the close collaboration between the surgeons and nursing staff in an organized surgical team, supporting a strong focus on across-the-board staff education with a shared vision of providing exceptional patient care.

Acknowledgments

We would like to thank David Denton, Six Sigma Master Black Belt, director of operational effectiveness at Memorial Hermann Southeast, for statistical analysis, and Debi Skillman, B.S.N., R.N., C.C.R.N., C.V.R.N., director of acute care and critical care services at Memorial Hermann Southeast, for her leadership and collaboration to accomplish this project.

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Discussion

David Antonenko, M.D., Ph.D. (Grand Forks, ND): The whole concept of team management, team training is not unique to medicine. This is true in almost any major industry, but the key issue is to get buy-in from a lot of individuals. That leads to my first question which is how much time did it take to get everybody really up to speed and have full buy in and where were assured that what they were doing was what you really wanted them to do? The second question has to do with the timing of the surveys. You sent out a very large number of surveys, but data suggests that the response of the individual to the survey following a certain intervention decays with time or changes with time, depending upon their perception and
the environment for the patient. When did you send out the survey, how long after the patient was in the hospital, and for those who did not respond, because you only had a 21% response rate which is really not very good, did you send it a second time and did you do any qualitative approach such as phoning them and evaluating their responses personally? Because many times that gives you a far more accurate view of someone sending in a survey.

Thank you.

Farzanah Banki, M.D. (Houston, TX): Thank you for the questions. Question 1: As far as how much time it took to get everybody up to speed, I would say it remains a continuous process which needs daily emphasis on what we are planning to achieve. It took us about six months to start to see significant change. It is a matter of changing a culture of an organization and implementing a set of processes to achieve improvement in outcomes and patient satisfaction. Most importantly, is building a team and making it believe in our vision of excellent patient care. Again, it is a never ending process. We meet every Wednesday with the team leaders and review all the daily issues of the prior week and discuss processes to improve patient care, review the cases for the following week and discuss the special needs of future patients. I think it is important to involve all the team members and validate the input from everyone during the weekly discussions to achieve best outcomes and patient satisfaction.

Question 2: The surveys are sent by Press Ganey, which is a consultant firm, totally independent of us. They are sent once after the patient is discharged and are not sent a second time for the same period. The average response from Press Ganey is about 16% across the entire organization, and I agree, 21% is low, but we worked based on what we had. In the presentation, I showed the survey data from October to December of 2012 and the survey response rate for the patients in our ward improved to 34%. We follow all patients once after the patient is discharged and are not sent a second time and did you do any qualitative approach such as phoning them and evaluating their responses personally? Because many times that gives you a far more accurate view of someone sending in a survey.

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Randall Smith, M.D. (Temple, TX): It was very impressive. I don’t think there is anybody in the audience that wouldn’t like to have a creative program like this, but it takes a lot of work. The 1 question I had about operative times, some of this I am guessing, is the fact that you are becoming more facile in doing the procedure yourself. So, in other words, the times are faster because you’ve done more and you are getting better at it.

Dr. Banki: Thank you for the question. We have designed a website that houses all the information. It took us about six months to design, so everything we said about the fact sheets, our operating procedure, and description of what we do is on the Memorial Hermann Esophageal Disease Center web site. The population is aging and more and more we will have older patients with higher acuity. I believe that soon everything will be given to the patients online via their phones and tablets. The older people or their family members will adapt to that new process. Eventually, everything will be online, but I don’t think we are there yet. The sooner our aging population gets used to electronic access, the better it will be for the them and their health givers. That will provide a completely higher and more efficient level of care.

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Dr. Banki: Thank you for the question. We have presented the data on the procedures that we thought we had already passed the learning curve. They were not complex VATS or robotic procedures that one would say that the surgeon got better over time. Laparoscopic Nissen and Heller myotomies are simple and routine procedures in our practice. We thought we had passed the learning curve for these procedures and the improvement in the operative time and the operative room related costs were due to assembling a surgical team and the dedication and hard work of the team members.

Dr. Smith: That is a pretty big change. That is a 50% drop in your time.