

Surgical Resident Bedside Rescues – Lifesaving Heroics

ABSTRACT

Background : Attempts at improvements in emergent bedside care of hospitalized patients is an ongoing process in many institutions. Recently, the development and role of rapid response teams has been well described in the literature. However, the role of surgical residents, who are typically not part of these teams, in emergent bedside care of patients, has not been well described in the literature.

Purpose : We present eleven instances of surgical resident bedside rescues over a two year period at Monmouth Medical Center and Newark Beth Israel Medical Center as a means of emphasizing their critical role in reducing adverse events and even mortalities.

Methods : Surgical residents at one institution submitted instances of bedside emergent bedside procedure rescues. The eleven reviewed cases are representative and do not include multiple central lines and include only two of many chest tube cases.

Results : Surgical bedside rescues included : an emergent reintubation, two openings of neck incisions for expanding hematomas, replacement of a dislodged tracheostomy tube, bronchoscopy for hemoptysis, emergent placement of chest tubes, rigid sigmoidoscopy for rectal bleeding, control of a permacatheter bleed, control of a ruptured femoral – femoral crossover bypass, and control of a bleeding tracheoinominate fistula.

Conclusion : Surgical residents possess bedside procedural skills beyond those of non surgical health care workers and rapid response members. These lifesaving skill are needed to reduce adverse events and even prevent mortalities in hospitalized patients.

Bleeding complications and invasive procedures such as chest tube placement, venous

cutdowns, and emergency endoscopy are situations where a surgical resident might be called first, in a teaching hospital.

Background

Attempts at improvements in emergent bedside care of hospitalized patients is an ongoing process in many institutions. Recently, the development and role of rapid response teams has been stressed in the literature (1). These teams typically include a critical care nurse, respiratory therapist, and intensivist. However, the role of surgical residents, who are typically not part of these teams, in emergent bedside care of patients, has not been well described in the literature. Dimick et al (2) compared the outcomes of complex surgical procedures between teaching and nonteaching hospitals (2). This study found lower operative mortality rates at teaching compared with non teaching hospitals. The lower mortality rate, however, was explained by higher procedural volume. The role of the surgical resident in emergent bedside procedures was not mentioned. We present eleven instances of surgical resident bedside procedure rescues from 2007 through 2008. These residents were on call in the hospital. Many of these patients would have died without surgical management delivered expeditiously by surgical residents.

Methods

The surgical residents at Monmouth Medical Center, a 400 bed community based university affiliated hospital, were asked to recall specific patient rescues from 2007 and 2008. Emergent central lines were eliminated in the review as they were so commonly requested by the department of medicine. The medicine residents do not insert central lines. The rescues were limited to in-hospital bedside procedures carried out by a surgical

resident. Intraoperative rescues by attending surgeons were described in an article by Goldfarb and Baker.(3) That type of rescue occurred when an attending surgeon was called into the operating room by another attending surgeon. These cases were presented during Morbidity and Mortality conference and gave particular credit to surgeons who "dropped everything" to help other surgeon with intraoperative dilemmas or misadventures.

Results

Eleven rescues were described. The surgical bedside rescues included a variety of emergent bedside procedures performed by the surgical resident on call. Six were carried out by PGY IV and five by PGY I, II, and III residents. The two major groups are those that had respiratory problems or bleeding problems.

Respiratory Complications

In the respiratory group, a patient had undergone a parathyroidectomy that morning. In the evening, the rapid response team was called by the nursing staff after the patient was found to be dyspneic and stridorous. The rapid response team placed the patient on a 100% nonrebreather mask, but the oxygen saturation was only 70%. The surgical resident was finally called to see the patient, and recognized the patient's stridor, dyspnea and neck fullness. He quickly prepped the wound, opened the parathyroid incision, and evacuated a large hematoma. This maneuver led to immediate relief of the patient's stridor and dyspnea, and the oxygen saturation increased to 100%. The patient was soon after taken to the operating room for wound exploration and a bleeding vessel that caused the hematoma was ligated. The patient was discharged the following day and has not suffered any further complications since this event.

The next case involved a 51 year old male who underwent an anterior cervical discectomy of C3-C4. The following morning, the patient had significant neck pain and swelling and dyspnea. The dressing was saturated with blood. The patient was emergently evaluated by a surgical resident, who then evacuated the neck hematoma by opening the incision at the bedside, relieving the patient's dyspnea. Active bleeding was present. The patient was transported to the OR where he was intubated. A neck exploration revealed a small bleeding arterial branch of the carotid which was ligated. The patient was then transported to PACU in stable condition.

The next two rescues involved two patients who underwent tracheostomies that were dislodged in the ICU. The first patient was dyspneic and the oxygen saturation quickly dropped to 65%. The critical care nurse notified the surgical resident who was unable to replace the tracheostomy tube and, therefore, proceeded to intubate the patient. The oxygen saturation returned to normal and soon after, the patient had the tracheostomy tube replaced in the operating room. The second was an obese patient who dislodged her tracheostomy and desaturated. The ICU nursing staff and medicine residents who happened to be present were unable to reinsert it. The surgical resident was called. At bedside the tracheostomy tract was retracted, opened, and the tracheostomy tube replaced. The oxygen saturations normalized and the patient recovered.

Another respiratory complication involved an 85 year old female with lung cancer had hemoptysis. The nursing staff contacted the on call surgical resident who performed a bedside bronchoscopy with application of thrombin and gelfoam, and the bleeding was controlled.

In two separate instances, chest tubes were placed in patients in emergency circumstances. In one, the chest tube relieved a pneumothorax. In the other patient the chest tube was inserted for a hemothorax after trauma. Both patients recovered without complication. Although ED physicians were present, they made no attempt to place chest tubes. There have been multiple situations where surgical residents had placed chest tubes after medical personnel had first been called.

Bleeding Complications

A 52 year old male who had undergone a trans-anal biopsy of the prostate and was discharged home. He returned later to the emergency room with dizziness and palpitations. The patient was hypotensive and tachycardic. He was admitted to the ICU and started on pressors by his internist. At this time, the patient had copious bright red blood per rectum. The medical critical care team transfused three units of packed red blood cells and the hemoglobin increased to 8.3. However, the bleeding continued. The gastroenterologist on call was contacted for an emergent colonoscopy to stop the bleeding. But he did not respond promptly. The surgical resident was then called emergently to the bedside. The resident immediately performed a rectal exam but the profuse bleeding made it impossible to identify the source. Therefore a rigid sigmoidoscopy at bedside was performed and the rectum irrigated. This allowed visualization of the bleeding source approximately 6 cm above the anal margin at what appeared to be the biopsy site. A laparoscopic Kitner with Gelfoam was passed through the scope and held directly on the bleeding site for 15 minutes and the bleeding stopped

and the vital signs normalized. The hemoglobin remained stable and there was no further bleeding, and the patient was discharged the next day.

Another chronically ill patient had previously undergone tracheostomy three weeks earlier, and the nursing staff discovered profuse bleeding around the tracheostomy site. The nurse could not control the bleeding with pressure, and the surgical resident on duty was paged. He held pressure over a suspected tracheoinominate artery fistula that controlled the bleeding. The patient was then taken to the OR for stent placement across what proved to be a tracheoinominate fistula. The patient recovered without further complication.

The next case involved a patient who presented to the Emergency Department with a broken permacatheter. The patient had a BP of 70/40 and the ED staff held pressure with gauze pads over the bleeding catheter. This gauze pressure did not stop the flow of blood from the broken catheter. The surgical resident was called and clamped the catheter proximal to the broken section.. The permacatheter was exchanged later that day in the OR and the patient had no further complications.

In a the final rescue, a 70 year old female had previously undergone a femoral-femoral crossover graft ten years ago. On the day of the rescue, the patient had a femoral artery angiogram performed by an interventional radiologist. Later that evening, the patient began to bleed profusely from the angiogram needle insertion site. The nursing staff and medical residents were unable to control the bleeding, and the interventional radiology attending was not immediately available. A surgical resident was, therefore, paged and arrived promptly. A quick evaluation revealed the bleeding in the femoral-femoral crossover graft. Digital pressure over the graft defect controlled the bleeding.

The patient was taken to the OR for repair of the graft. The patient had required in total five units of packed red blood cells, and recovered from this nearly fatal event.

Discussion

These eleven rescues, carried out by surgical residents had potentially lethal presentations. Of course, numerous emergent central line insertions and cut downs, are a part of the overall daily tasks of surgical residents at our hospital were not included in our series of eleven patients. PGY1 through PGY 4 surgical residents were involved in these rescues without an attending present because of the nature of the emergency. In several cases, other health care professionals, were unable to remedy the patients' problems. Those health care professionals were members of the "rapid response team (RRT)," emergency staff, nursing staff, respiratory therapists, emergency room staff, or other medical residents who were initially summoned to the bedside. The surgical resident was, therefore, called for assistance. The RRT at our hospital does not include a surgical resident and the RRT members are not able to deal with certain surgical complications or conditions that require immediate surgical intervention. We do not have surgical residents on the RRT because most of the RRT request are for non surgical problems and usually nurses properly call surgical residents for surgical issues. A surgical resident, however, is always available and is on the code team.

The surgical resident therefore should be the first choice in dealing with these problems because he has an understanding of surgical complications and post operative anatomy. For example, with regards to the tracheoinominate fistula, the knowledge of the inominate artery and the direction of the tracheostomy tube is key to control bleeding. In

the patient with the neck hematoma, knowing that the sutures can easily be removed and the incision opened was essential to relieve airway compression.

Hemostasis is a part of every surgical procedure, elective or emergent and surgeons are trained to become skilled at external and internal bleeding control maneuvers.

All of the surgical rescues mentioned are not rare events. Surgical residents should know how to diagnose and treat these surgical situations inherent to surgical training. There were no deaths, due to effective treatment. A study from Abbas et al reported incidence of reoperation for bleeding after thyroid surgery at 0.7% (6 out of 918 patients) and for parathyroid surgery 1.1% (4 out of 350 patients) (3). Two patients in our study required emergent openings at bedside due to post operative hematoma and worsening airway obstruction. Postoperative tracheotomy complications are also well known.

According to a study from El Solhi residents should be particularly attentive to tracheotomy complications in the morbidly obese as was one patient presented in this study (4). El Solh et al indicated obesity was independently associated with increased risk of tracheostomy related complications. Of eighty-nine morbidly obese patients who had a tracheotomy, there were 27(25%) complications, and of nine serious events there were two deaths. These life threatening complications were attributed to tube obstruction and malpositioning after dislodgement (3).

Massive hemoptysis, a life threatening condition, may be managed with bedside bronchoscopy and we presented one such case. The efficacy of bronchoscopy guided topical hemostatic tamponade therapy has been recently described by Valipour, et al in Chest 2005 (5). The technique was successfully performed on 56 out of 57 patients with an immediate arrest of hemoptysis. All of the patients were successfully treated and

remained free of hemoptysis for the first 48 hours and none required immediate surgery. This supports the need for surgical residents to become adept at bronchoscopy.

The rescues detailed describe some of the acute problems that surgical residents treat. Other emergent surgical bedside procedures not described include cricothyroidotomy and tracheostomy for respiratory distress, bronchoscopy for removal of foreign object or mucous plug, and pericardiocentesis for cardiac tamponade.

In several patients, attempts at control of bleeding prior to the arrival of the surgical residents failed. It is likely these patients would have exsanguinated without the surgical rescue. The patients who required opening of the neck incisions could have completely lost their airways and expired due to extent of hematoma. As far as the patients who required emergent intubation, they also would have likely suffered hypoxic complications and death without the surgical rescue.

Rapid response teams, respiratory therapists, critical care nurses, and medical residents play an important role in bedside emergencies. We have described situations, however, where surgical residents should have been called first. Bleeding is best handled by surgical residents, who are trained to deal with hemostasis problems inherent to every surgical procedure. Secondly, invasive procedures, such as emergent chest tube insertion, venous cutdowns, and bronchoscopy may be handled more expeditiously by surgical residents, especially when attending physicians are not immediately available in the hospital.

Clearly the complications presented are not rare and appear in many hospitals. Outcomes of the management of these problems comparing teaching and non teaching hospitals have not been published. Many non surgeons may take for granted the “routine

rescues” by surgical residents. At Monmouth Medical Center we make it a practice at our M and M conference to specially credit our residents who have rescued patients. We similarly also keep track of any attending operative rescue of another surgeon and present those cases, as well. Our collegial policy of surgeons immediately helping each other has saved many lives over the years and was reported in " A Eight Year Analysis of Surgical Morbidity and Mortality- Data and Solutions." Perhaps an analysis of the causes of death in post op surgery patients in teaching vs nonteaching hospitals might elucidate this issue.

References :

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