Graduate Medical Education and Patient Safety

TO THE EDITOR: I read with interest the excellent Quality Grand Rounds article on graduate medical education by Shojania and colleagues (1). Although I work at a small (100-bed), community-based, semirural, nonteaching hospital, I was struck by the similarity of the case to a recent root-cause analysis performed at my hospital. These similarities include an unreported, unlooked-for imaging study; “anchoring bias” (2); lack of a structured sign-out system; lack of communication between the admitting and covering physicians; and time and workload pressures.

I was also struck that the authors’ case analysis did not consider the nursing involvement in the care. The authors did not indicate whether the nurse was aware of why she was asked to insert a nasogastric tube or whether this issue was recognized as a contributing cause. If the nurse or nurses involved had known the reason for the nasogastric tube, then the correct tube and, perhaps, the appropriate type of suction would have been used. At a time when medicine is increasingly systems- and protocol-driven and nursing care is increasingly task-oriented, having a team approach that includes the nursing staff has become more important but harder to accomplish.

It is clear that a major barrier to a more collaborative approach is interruptions (3) and workarounds (4, 5) that interfere with nurses’ workflow. Over a shift, these disruptions can add up to considerable time. Getting back on task can take additional time and can lead to errors. Addressing this issue could give nurses more time to be involved with the medical staff and become more aware of the medical issues involved. We are working very hard to correct this situation so that nurses can better function as part of the team. In this case, if the hole in the nursing staff’s slice of the Swiss cheese was smaller, the outcome could have been much different.

I would like to thank the authors of this report and the editors of this series for putting patient safety on a more equal footing with the more traditional medical specialties. Attention to these issues will not only improve patient care, but it will also make good care of patients more rewarding and enjoyable for everyone involved. However, we can’t make progress unless we believe that there are solutions.

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Potential Financial Conflicts of Interest: None disclosed.

References

TO THE EDITOR: In their recent Quality Grand Rounds article, Shojania and colleagues (1) described a case in which problems in communication and supervision among and between residents and an attending physician led to the possibly preventable death of an 88-year-old woman with intestinal obstruction. The authors suggested how one might minimize sign-out and handoff problems, reduce tension between service and supervision, and encourage trainees to call for help.

The case description noted that a fourth-year medical student offered to insert a nasogastric tube because she wanted to learn how to perform the procedure. Miscommunication between the student and the supervising nurse resulted in the insertion of a feeding tube instead—just one in a sequence of errors that ultimately led to the death of the patient. In their discussion of this portion of the case, the authors overlooked an opportunity to comment on approaches to “learning by doing” through the use of simulation. Soon it will no longer be necessary for medical students to perform their first procedures on actual patients. Simulation laboratories in medical schools will provide the opportunity for students, trainees, and faculty to achieve core competencies in invasive procedures without the risk for harm to patients. Consensus statements have been developed about the use of such tools as simulation and virtual reality for teaching and evaluating these competencies (2). How the current and future use of these technologies will replace the apprenticeship model for developing procedural skills should be of interest to all medical educators (3).

The case also highlighted the importance of knowing when to call for help. In their discussion of this issue, however, the authors failed to suggest strategies to reduce the potential for patient harm when the resident does not call for help. One such strategy is the development of a hospital rapid response system in which nurses are authorized to call for medical emergency teams when a patient’s condition is observed to be unexpectedly and seriously worse. Although this approach was initially developed in nonteaching hospitals, it is equally relevant in teaching hospital settings. Readers may be interested in the recently published findings of the first consensus conference on medical emergency teams (4).

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References
TO THE EDITOR: In the case described in the recent Quality Grand Rounds article by Shojania and colleagues (1), the initial management of the patient reflects the treating clinician’s understandable expectation of a rapid recovery from “mild pancreatitis.” This expectation is wrong. Pancreatitis in patients older than 65 years of age would have a statistical mortality rate of 20% (2). In patients older than 80 years, the mortality rate is probably higher—perhaps 40% (3). Usual prognostic criteria do not seem to apply to elderly patients (3, 4). Nor does resolution of pancreatitis, which occurred in this case, guarantee a good outcome. Age-adjusted mortality rates are 30 times higher in the first month after admission and 7 times higher in the second month (2).

Failure to appreciate that even “mild” disease in this particular patient had a very high mortality rate was probably the single biggest contributor to a potentially preventable death. Admission to an acute care unit to help ensure closer monitoring and adherence to therapy was likely the fundamental oversight.

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Potential Financial Conflicts of Interest: None disclosed.

References

IN RESPONSE: We thank Dr. Fine for his kind remarks about the Quality Grand Rounds series. Our article highlighted the importance of clear communication and the ways in which failure to explain key aspects of the care plan contributed to several errors in the case. We focused on physician trainees because of space limitations. However, we agree that poor physician–nurse communication contributed to the mistaken insertion of a feeding tube instead of a nasogastric tube, and failings in this area are an important source of medical errors.

We agree with Dr. Griner that the use of simulation promises to improve the acquisition of key procedural skills by trainees. A rapid response team may also have helped in the case, but the physicians’ responses to the nurse’s pages were in fact quite timely and the nurse seemed satisfied by the physicians’ assessments. In other words, even if a rapid response team had been available in the hospital at the time, there was no indication that the nurse would have called for it. Moreover, despite widespread enthusiasm for rapid response teams, the only randomized, controlled trial to evaluate their efficacy showed no benefit (1) and other studies that have reported benefits suffer from important methodological limitations (2).

Dr. Workman highlights our characterization of the treating clinicians’ impression of “mild pancreatitis” and their expectation of an uneventful recovery. As part of our preparation of the case discussion, we reviewed the study cited by Dr. Workman, which reported outcomes of pancreatitis stratified by age (3). Although it is not clear what proportion of patients who died had initially appeared clinically stable (as in the case we discussed), we agree that the possibility of adverse outcomes from pancreatitis should never be underestimated, especially in elderly persons.

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References

Blood Products for Spanish Influenza: A Future H5N1 Treatment?

TO THE EDITOR: We would like to add to the discussion in Luke and colleagues’ meta-analysis (1) of historic literature about the possible beneficial effect of transfusion on the clinical outcome of patients with Spanish influenza. We suggest that the effect might not be due to the specific neutralizing effects of anti-influenza antibodies in the blood product but rather to the transfusion of whole blood, including immunoglobulins (and thus the provision of plasma oncotic pressure).

We recently reported on a previously healthy man with severe shock who required admission to the intensive care unit. His condition was associated with an almost complete disappearance of circulating immunoglobulins (2). Immunoglobulin levels were 0.23 g/L (IgA), 0.12 g/L (IgM), and 1.0 g/L (IgG) at admission. With supportive treatment, including administration of fresh frozen plasma, the condition of the patient improved rapidly. In days, immunoglobulin levels returned to normal. Only influenza A virus (H3N2) could be isolated, which suggested a causal relationship. The acute onset and nearly fatal course resembled that of patients during the Spanish influenza pandemic. We were able to retrieve a plasma sample from
the patient that had been obtained 2 weeks before the acute onset of disease. We found that predisease immunoglobulin levels were normal, as opposed to the almost total disappearance of immunoglobulins in the acute stage of the illness.

Therefore, keeping limitations of this single observation in mind, we suggest that the possible beneficial effect might be caused by the administration of protein, including immunoglobulins, that occurs in whole-blood transfusion.

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Potential Financial Conflicts of Interest: None disclosed.

References

IN RESPONSE: We agree with Drs. Logtenberg and Bilo that the possible benefit of convalescent blood products, including plasma, for treating Spanish influenza pneumonia may not have been entirely due to the presence of neutralizing antibodies.

Plasma is a complex mixture of immunoglobulins, coagulation factors, cytokines, and other immunologically and physiologically active molecules. It is sometimes used to treat patients with circulatory collapse—presumably because it expands volume while increasing oncotic pressure, as theorized by Drs. Logtenberg and Bilo. Furthermore, both adaptive and innate immune responses likely contribute to the control of influenza infections. Products of the innate immune system in plasma may have contributed to controlling the infection in the patient in Drs. Logtenberg and Bilo’s study and in the patients reported in our paper.

However, the therapeutic effect of passively delivered neutralizing antibodies cannot be dismissed. Multiple strains of H3N2 influenza have circulated globally since the illness first arose in 1968, and many if not most plasma donors have been exposed to multiple wild-type H3N2 strains, seasonal influenza vaccines, or both. The fresh frozen plasma units transfused into the patient in their report may have contained neutralizing H3 antibodies. We believe that Drs. Logtenberg and Bilo’s experience suggests that patients with serious seasonal H1 or H3 influenza infections may benefit from receiving transfusions with plasma with an unknown titer of neutralizing antibodies or preferably with plasma or purified immunoglobulin that is specifically selected for a high titer of H1 and H3 antibodies.

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Sirolimus Treatment for Pulmonary Lymphangioleiomyomatosis

Background: Lymphangioleiomyomatosis (LAM) is a rare disease characterized by abnormal proliferation of smooth-muscle cells within the lung (1) that are responsible for the cystic destruction of lung parenchyma, leading to chronic respiratory failure (2). No effective treatment, except for lung transplantation, is available. Abdominal tumors (renal angiomyolipomas, lymphangioleiomyomas, and enlarged lymph nodes) are frequently associated with lung involvement. Recently, loss-of-function mutations in the tumor suppressor genes tuberous sclerosis 1 and 2 (TSC1 and TSC2, respectively) have been described in LAM (3). In vitro studies on LAM smooth-muscle cells have shown that mutation on the TSC1–TSC2 complex dysregulates the activation of ribosomal protein S6 kinase 1 (S6K1), which leads to abnormal cell proliferation (4). Sirolimus (rapamycin), a specific S6K1 inhibitor, abolishes LAM cell abnormal proliferation in vitro (5).

Objective: To determine whether sirolimus could provide clinical benefit for patients with LAM.

Case Report: A 34-year-old black female nonsmoker received a diagnosis of sporadic LAM in the setting of diffuse, round, thin-walled pulmonary cysts and chylothorax in the right lung that were associated with several large retroperitoneal and pelvic lymphangioleiomyomas and large uterine myomas. At diagnosis, pulmonary function tests revealed reduced lung volumes and low diffusing capacity of the lung for carbon monoxide (DLCO), and arterial blood gas analysis showed profound hypoxemia. Lung biopsy was not considered because of the severity of respiratory failure. Sirolimus treatment, 4 mg/d, was started in October 2005. The treatment was well tolerated, expect for a moderate elevation of serum cholesterol level. General status improved, with a total weight gain of 8 kg. Arterial blood gases improved (Po2 increased from 54 to 65 mm Hg on room air), allowing weaning from oxygen support after 6 months. Exercise capacity, assessed by a 6-minute walking test, also greatly improved: The patient could walk 105 meters at diagnosis and 450 meters after 8 months of treatment. The FVC increased from 1820 mL (51% of predicted value) to 2700 mL (75% of predicted value), and DLCO did not change after treatment. On computed tomography of the chest, right pleural effusion disappeared after 3 months, but the number and size of pulmonary cysts did not change after 8 months (Figure, A and B). On magnetic resonance imaging, abdominal and pelvic masses completely disappeared (Figure, C and D).

Discussion and Conclusion: This case supports the hypothesis that given its antiproliferative effects on smooth-muscle cells, sirolimus could be a therapeutic option for lymphangioleiomyomatosis. However, sirolimus seems to have more important effects on the reduction of abdominal masses than on the reduction of lung cysts.

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References

CORRECTIONS

Correction: New Tests for the Diagnosis of Latent Tuberculosis Infection
The recent meta-analysis on new tests for diagnosing latent tuberculosis infection (1) contained errors in some table headings. Under the “Concordant Results” heading in Table 4 and Table 5, the second heading should have stated “TST-Negative and IGRA-Negative.” Under the “Concordant Reactions” heading in Table 6, the second heading should have stated “T-SPOT.TB—Negative and QFT-G—Negative.” These errors do not affect the results reported in the tables.

Reference