CE 2.0 ANCC Contact Hours

Advanced Practitioners Are Peers in Trauma Performance Improvement Peer Review

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ABSTRACT

Advanced practitioners (APs) have been successfully integrated into the clinical care of injured patients. Given the expanding role of APs in trauma care, we hypothesized that APs can perform Performance Improvement and Patient Safety (PIPS) peer review at a level comparable with trauma surgeons. For Phase 1, cases previously reviewed by a trauma surgeon were randomly selected by the PIPS coordinator and peer reviewed by an AP. The trauma surgeons' and APs' reviews were compared. For Phase 2, cases requiring concurrent review were peer reviewed by both an AP and an MD, who were blinded to each other's review. Both the APs' and trauma surgeons' reviews of the same medical record were presented at a bimonthly performance improvement (PI) meeting. In Phase 1, 46 PI cases were reviewed including 22 deaths. Trauma surgeons and APs had high concordance (96.0%) regarding appropriateness or inappropriateness of care ($\kappa = 0.774$). Among disagreements, APs were 3 times more likely than trauma surgeons to determine care to be inappropriate. Trauma surgeons and APs had similarly high concordance (95.5%) regarding preventability of mortality ($\kappa = 0.861$). In Phase 2, 38 PI cases were reviewed, including 31 deaths. Trauma surgeons and APs had high concordance (89.0%) regarding appropriateness or inappropriateness of care ($\kappa = 0.585$). Among disagreements, trauma surgeons and APs had similarly high concordance (86.2%) regarding preventability of mortality ($\kappa = 0.266$). We found that APs had high concordance with trauma surgeons regarding medical record reviews and are thus able to effectively review medical records for the purposes of PIPS.

Key Words

Advanced practitioners, Nurse practitioner, Peer review, Performance improvement, Physician assistant

The American College of Surgeons Committee on Trauma ([ACS/COT], 2014) mandates that all designated trauma centers participate in a rigorous Performance Improvement and Patient Safety (PIPS) process to improve care provided to trauma patients. This process includes real-time data entering via a trauma registry, analysis of data, multidisciplinary review, identification of care, and system issues and issue resolution (ACS/COT, 2014).

In Pennsylvania, trauma centers are accredited by the Pennsylvania Trauma Systems Foundation (PTSF), which is a not-for-profit organization. Goals of PIPS for the PTSF include the following:

- Monitor the process and outcome of patient care;
- Ensure the quality and timely provision of such care;
- Improve the knowledge and skills of trauma care providers; and
- Provide the institutional structure and organization to promote performance improvement and patient safety (PTSF, 2012).

Although PIPS is vital to improve trauma care, it can be cumbersome and overwhelming for trauma centers. Some trauma centers utilize a medical record review, which is usually performed by physicians, as a component of PIPS to identify issues in care (Fitzpatrick et al., 2000).

At our institutions, medical records requiring review by trauma surgeons are selected by the trauma program directors and PIPS coordinators, based on audit filter criteria determined by the PTSF. The PTSF requires review of all deaths, transfers, morbidities, quality issues, systems issues, provider issues, and practice management guideline issues (PTSF, 2012). The medical records are reviewed to determine the appropriateness of care with respect to quality, timeliness, and documentation rendered throughout all phases, and mortality is categorized as

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The authors declare no conflicts of interest.

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preventable, potentially preventable, or nonpreventable. These medical records are then presented by the physician reviewer at a bimonthly performance improvement (PI) meeting attended by trauma surgeons and PIPS coordinators, and a discussion regarding the care follows (Fitzpatrick & McMaster, 2009). Our advanced practitioners (APs), including nurse practitioners and physician assistants (PAs), have been involved in trauma care within our system for more than 15 years and did not have a defined involvement in our peer review process.

Changes in trauma care and trauma care delivery including increased trauma volume, a documented shortage of trauma surgeons and surgical resident work hour restrictions, have allowed APs to become key team members in providing trauma care. Successful integration of APs into trauma care has been well documented and has shown decreased length of stay, increased facilitation of rehabilitation and discharge planning, improvement in documentation, and increased patient satisfaction scores (Christmas et al., 2005; Fanta et al., 2006; Gillard et al., 2011; Miller, Riehl, Napier, Barber, & Dabideen, 1998; Sole, Hunkar-Huie, Schiller, & Cheatham, 2001; Spisso, O'Callaghan, McKennan, & Holcroft, 1990). In addition, when AP care was substituted for resident care, there has been no increase in complications or mortality (Miller et al., 1998; Oswanski, Sharma, & Shekhar, 2004). Given that APs have become critical in the direct care of trauma patients, we sought to increase their involvement in trauma PIPS to broaden their education, improve trauma care, and promote accountability for individual AP's decisions and actions. We hypothesized that APs would be able to accurately review medical records and determine appropriateness of care rendered and therefore become active participants in the peer review PIPS process.

METHODS

We conducted a two-phased study. An urban, Academic Quaternary Level I trauma center and a network-affiliated suburban Level II trauma center participated in this study. The study protocol was approved by the institutional review board. All trauma and surgical critical care APs at both institutions consented and voluntarily participated in the study. The APs received a brief orientation to the medical record review process by the PIPS coordinator prior to the start of this study.

For Phase 1 of the study, the trauma PIPS coordinators at each institution randomly selected medical record charts that had been previously reviewed by a trauma surgeon for the purposes of PIPS. The trauma medical record review form was developed internally by each institution's PIPS coordinators and prompts reviewers to evaluate appropriateness of care rendered at all phases and classifies mortality as preventable, potentially preventable, or nonpreventable. Table 1 further delineates items captured on the trauma medical record review form. The trauma medical record review form completed by the surgeon was removed from the medical record to blind the APs from

TABLE 1 Key Components of Performance Improvement and Patient Safety Form

Prehospital phase
Was there prenotification?
Was the level of transport correct?
Was the airway managed appropriately?
Were there any issues with care?
ED phase
Trauma Bay alerts and responses
Were team members arrival times appropriate?
Was there evidence of ED attending involvement?
Was the airway managed appropriately?
Were appropriate actions taken to address patient's condition?
Was ATLS followed?
Were appropriate diagnostic and/or therapeutic procedures performed?
Were there any issues with trauma bay care?
Trauma consults
Was correct triage tier used?
Was the timing of consult appropriate?
Were the appropriate diagnostic tests ordered by ED attending?
Were there any issues with care?
Acute care phase
For patients admitted directly to the OR; was OR available, was OR/PACU care appropriate?
Were clinical management guidelines followed appropriately?
Were they any issues with care?
Rehabilitation and discharge phase?
Was a discharge plan written in progress notes and/or discharge summary?
Was there evidence of trauma follow-up?
Was there evidence of specialty follow-up?
Overall evaluation of care
Was care acceptable, acceptable with reservations, or not acceptable?
If patient expired, was mortality preventable, nonpreventable, or potentially preventable?

Note. ATLS = Advanced Trauma Life Support; ED = emergency department; OR = operating room; PACU = postanesthesia care unit.

the surgeons' review. The APs were randomly assigned these medical records to review with a blank trauma medical record review form to complete. Medical records reviewed because of question in surgical technique or intraoperative decision making were excluded.

Forms were submitted to the Trauma Program Medical Director, who compared the trauma medical record review form from both the surgeon and the AP. The initial evaluation done by the trauma surgeon was used as the gold standard, and the sum of agreements and disagreements was calculated for each medical record. Concordance was defined as agreement of responses on the PI form. Kappa statistic was used to compare agreement between APs and trauma surgeons.

Upon completion of Phase 1 of the study, Phase 2 was initiated. For Phase 2, medical records requiring concurrent PIPS review were randomly assigned to both a trauma surgeon and an AP. Both the surgeon and the AP were blinded to each other's review, and both completed the trauma medical record review form independently of each other. Both reviews were presented at bimonthly PIPS meetings. Medical records reviewed because of question in surgical technique or intraoperative decision making were excluded. The Trauma Program Medical Director compared the trauma medical record review form from both the surgeon and the AP. The trauma surgeon review was used as the gold standard, and the sum of agreements and disagreements was calculated for each medical record. Concordance was defined as agreement of responses on the PI form.

RESULTS

For Phase 1, 46 PIPS cases were reviewed (total 932 responses, mean 20.3 responses per case), including 22 deaths. Patient characteristics, including the number of PI issues, are listed in Table 2. Both APs and physicians had a high concordance (96.0%) regarding appropriateness or inappropriateness of care (Table 3; κ = 0.774). Among disagreements, APs were three times more likely than trauma surgeons to determine care to be inappropriate. Trauma surgeons and APs had a similarly high concordance (95.5%) regarding preventability of mortality (Table 4; κ = 0.861). Areas of disagreement revolved around clinical management guidelines with a

TABLE 2 Patient Characteristics

	Phase 1	Phase 2
Age (mean ± SD)	49.6 ± 26.2	46.4 ± 22.6
ISS (mean ± SD)	22.2 ± 14.7	26.2 ± 20.7
Mechanism of injury	37 blunt; 9 penetrating	20 blunt; 18 penetrating
Outcome (mortality)	58.6%	81.6%
Number of additional PI issues identified	22	16

Note. ISS = Injury Severity Score; PI = performance improvement.

TABLE 3 Peer Review Determinates of Performance Improvement Review for Phase 1 and Phase 2

Advanced Practitioners	Trauma Surgeons			
	Phase 1		Phase 2	
	Appropriate	Inappropriate	Appropriate	Inappropriate
Appropriate	88.3%	1.0%	84.6%	1.9%
Inappropriate	3.0%	7.7%	2.0%	3.0%

TABLE 4 Peer Review Determinate of Mortality for Phase 1 and Phase 2

Advanced Practitioners	Trauma Surgeons					
	Phase 1			Phase 2		
	Nonprev.	Pot. Prev.	Prev.	Nonprev.	Pot. Prev.	Prev.
Nonprev.	17	0	0	24	3	0
Pot. Prev.	1	4	0	1	1	0
Prev.	0	0	0	0	0	0

Note. Nonprev = nonpreventable; Pot. Prev. = potentially preventable; Prev. = preventable.

concordance of 92%, followed by prehospital care with concordance of 93%. Highest agreement was noted in initial evaluation and disposition. Advanced practitioners were more likely to note the absence of tertiary survey forms and incidental finding forms, as well as deviations from clinical management guidelines, than trauma surgeons. Conversely, trauma surgeons were likely to note issues with time delays to the operating room and chest tube management. Further areas of discrepancies included antibiotic management, triage decisions, and airway management, which were noted by both APs and trauma surgeons.

For Phase 2, 38 PI cases were reviewed (total 799 responses, mean 21.0 responses per case), including 31 deaths. Patient characteristics, including the number of PI issues, are listed in Table 2. Advanced practitioners and trauma surgeons had a high concordance (89.0%) regarding appropriateness or inappropriateness of care (Table 3; $\kappa = 0.585$). Among disagreements, trauma surgeons and APs had a similarly high concordance (86.2%) regarding preventability of mortality (Table 4; $\kappa = 0.266$). Highest levels of disagreements were found regarding clinical management guidelines compliance and prehospital care, with concordances of 87% and 88%, respectively. Highest agreement was noted in initial evaluation and disposition phases of care. Advanced practitioners noted issues with following Advanced Cardiovascular Life Support (ACLS) guidelines and prehospital airway management, whereas trauma surgeons noted issues with necessity of computed tomographic scans, issues with documentation and management by consultants, as well as management issues in actively bleeding patients. Both APs and trauma surgeons agreed on issues with documentation in code situations, admitting disposition, time delays to the operating room, pain management, and airway management.

DISCUSSION

We found a high concordance between AP and physician responses with respect to appropriateness, timeliness, and documentation of care across all phases, as well as with the determination of mortality. We believe this may have been the result of the close involvement of APs and physicians in daily patient care and their specialized certification and experience in trauma care. At our institutions, both APs and physicians participate in a Morning Report where care is discussed, round together daily on trauma patients, and attend the same educational sessions. In addition, APs and physicians at both institutions are certified in Advanced Trauma Life Support and/or Advanced Trauma Care for Nurses and many are also instructors of these courses. By enabling the APs and physicians to have advanced specialty education and certifications alongside one another as partners, both are taught the same standards of care. In addition, both develop, monitor, and are accountable for trauma and critical care clinical practice guidelines at each institution, thereby decreasing variability in practice and creating an evidence-based approach to care.

As previously stated, one area of disagreement pertained to APs being three times more likely to determine that care was inappropriate. Because APs were new to the PIPS process, there was a knowledge deficit on how to assign "appropriateness of care." During the PIPS meetings, the physicians had an opportunity to discuss the assignment of care for each medical record reviewed, and through this process they were able to ask for clarification before assigning appropriateness of care. The APs, however, did not attend the PIPS meetings before this study and were not familiar with the assignments of care. Furthermore, the APs had not been given instructions or examples as to the appropriate assignment of care. The Hawthorne effect could also explain this result, as the APs were aware they were being studied and that their responses would be compared with physicians' responses. This may have influenced the APs to be more critical in their critique of care provided than the physicians who were unaware that their results would be analyzed or compared.

The highest level of disagreement pertained to prehospital care and clinical management guidelines. The disagreement in prehospital care was likely due to unfamiliarity with the level of prehospital transport and capability on the part of the APs. The APs were not correct in their assessment due to lack of knowledge on the trauma standards regarding prehospital care. With regard to the disagreement in clinical management guidelines, although both APs and trauma surgeons were responsible for creating, maintaining, and complying with the clinical management guidelines, the APs audit compliance on a concurrent basis as a routine part of their job and were perhaps more consistently "by the book" on their assessment of appropriateness of deviations. The surgeons allowed for deviations in the guidelines; however, the APs did not. For instance, the venous thromboembolism prophylaxis guideline recommended a screening venous duplex for certain patients between Days 5 and 7 of admission. If the patient met criteria for the duplex and the duplex was performed but not between Days 5 and 7 of admission, the APs deemed care inappropriate from compliance of guidelines whereas the surgeons did not. For this study, there was no reeducation of the APs and surgeons as to standards on determining appropriateness of care; therefore, there are no follow-up data. This is a limitation of the study.

The results for Phase 2 were not as robust as the results for Phase 1. Phase 2 was performed in real time, and the APs had 1 week or less to complete the assigned review whereas in Phase 1, the APs had over a month to complete the reviews. Because this was not part of their usual

work flow and there was no protected time to participate in the study, they had little time to complete the reviews.

We excluded medical records reviewed for issues with surgical technique. We believe, however, that APs could review these medical records as long as a trauma surgeon reviews the operative phase of care. This is similar to the process used to review subspecialty care. For instance, at both institutions, a medical record requiring review for concern for issues with neurosurgical care is routinely reviewed by a trauma surgeon and then by a neurosurgeon. The neurosurgeon focuses solely on reviewing issues related to neurosurgical care, whereas the trauma surgeon reviews the medical record in its entirety.

Beyond the performance of daily patient care-related activities, APs have demonstrated effectiveness in other aspects of a trauma care including the development and implementation of tertiary survey protocols, dissemination of incidental findings, and other quality improvement initiatives. Huynh et al. (2010) found that 80 missed injuries were identified in a 2-year period when APs initiated and developed a tertiary survey protocol and form. Collins, McNicholas, and Butler (2011) found a reduction in missed injuries with an AP-initiated tertiary survey protocol and also found high compliance with the protocol by the APs. Huynh et al. (2008) found APs were effective at communicating and documenting incidental findings. Miller et al. (1998) described the use of PAs in trauma quality improvement. Physician assistants presented complicated trauma cases at weekly meetings attended by a multidisciplinary team that focused on management issues at these meetings. However, it is unclear from this study how much involvement the PA had in critically evaluating the care provided. This is the only known published reports regarding APs involvement in PIPS.

Advanced practitioners have also been utilized in quality improvement in other specialties. Kleinpell, Ely, and Grabenkort (2008) reviewed more than 145 articles regarding the role of APs in the acute care setting and found that APs were involved in quality improvement initiatives including developing and monitoring compliance with practice management guidelines and initiating rapid response teams. Gracias et al. (2008) utilized APs to develop practice management guidelines for a surgical critical care service and found a significant increase in compliance when APs were part of the patient care team. Both Morse, Warshawsky, and Moore (2006) and Dacey et al. (2007) found positive effects with APs leading rapid response teams.

Although APs are becoming more involved in quality improvement and departmental projects, there continues to be opportunity for greater improvement. Kleinpell (2005) surveyed acute care nurse practitioners (ACNPs) for 5 years regarding their roles and found that roughly 17%–31% of respondents listed quality assurance as being part of the their role as an ACNP. Similar percentages were found regarding program development and departmental projects. Moote, Krsek, Kleinpell, and Todd (2011) surveyed 26 academic medical centers regarding the use of APs and found these organizations reporting that APs could provide a larger role in quality improvement and patient safety within their organization. In a survey of 68 ACNPs involved in trauma care, ACNPs reported spending on average 18.7% of their work time on administrative duties and 81.3% of their time on clinical duties (Noffsinger, 2014). Twenty-four percent of the ACNPs reported no administrative time, and 76% reported less than 20% of administrative time. As APs become more involved in quality improvement, protected time for administrative duties may need to be addressed.

By utilizing APs in PIPS, APs have had an opportunity to increase their involvement in quality improvement.

CONCLUSION

Our study sought to determine whether APs could critically evaluate the care provided to patients as peers and determine whether that care was acceptable. We believe that our study revealed that APs are able to effectively critique the care provided to trauma patients and serve as colleagues and partners in the peer review process. The utilization of the APs in peer review does need further study, as this was a single-center study. In addition, the role of the APs in peer review will vary depending on institutional needs; however, we recommend that APs be actively involved in the peer review process. Our recommendation is not that the APs replace physicians in the review process but are integrated as partners and peers. In our study, the APs did not receive protected time to perform the medical record reviews; however, if this becomes an expectation of the AP role, it is something that should be addressed.

KEY POINTS

- Advanced practitioners have been successfully integrated into the clinical care of injured patients.
- Given the expanding role of APs in trauma care, we hypothesized that APs can perform PIPS peer review at a level comparable with trauma surgeons.
- We found that APs had high concordance with trauma surgeons regarding medical record reviews and are thus able to effectively review medical records for the purposes of PIPS.

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