Research Article

Impact of interdisciplinary rounds in the spinal cord injury unit on relational coordination for patients with pressure injury: A pilot study

Yuewei Wu-Fienberg, Mary K. Henzel, Mary Ann Richmond, Devra B. Becker

Louis Stokes Cleveland Department of Veterans Affairs Medical Center, Cleveland, Ohio, USA

Context/Objective: Multiple medical specialties are often involved in the management of patients with both spinal cord injuries (SCI) and pressure injuries (PIs), sometimes leading to inadequate communication. Our Veterans Affairs (VA) hospital has an interdisciplinary team for PI patients in the SCI unit. This team conducts monthly bedside rounds and journal clubs; there is no similar team for patients with PIs outside the SCI unit. This pilot study aims to determine whether such an interdisciplinary team improves care coordination among practitioners.

Design: Survey-based study.

Setting: VA hospital.

Participants: Healthcare providers who participate in interdisciplinary SCI rounds and who also care for patients with PIs outside the SCI unit.

Interventions: Interdisciplinary rounds, including monthly bedside rounds and journal clubs with variety of specialists take place within the SCI unit. There are no similar interdisciplinary rounds for patients with PIs outside of the SCI unit.

Outcome Measures: The Relational Coordination (RC) survey is a validated tool for gauging team performance. Survey results quantified relational dynamics inside and outside the SCI unit across four communication domains (frequent communication, timely communication, accurate communication, and problem-solving communication) and three relationship domains (shared knowledge, mutual respect, and shared goals).

Results: Interdisciplinary rounds in the SCI unit was associated with significantly better RC with hospitalists, surgical specialists, infectious diseases, nursing, and pharmacy. This effect was primarily due to improvements in communication domains, without significant difference in relationship domains.

Conclusions: Interdisciplinary rounds in the SCI unit significantly improves RC in the care of PI patients.

Keywords: Pressure injury, Interdisciplinary care, Relational coordination, Pilot study

Introduction

A pressure injury (PI) is a localized damage to the skin and underlying soft tissue, usually over a bony prominence or related to a medical or other device.¹ PIs are common, being noted as a diagnosis in over 500,000 US hospital stays in 2006,² and associated costs are high, with monthly healthcare costs per PI patient averaging \$4745.³ Risk factors and comorbidities associated with the development of PI are numerous and include immobility, compromised tissue perfusion, poor nutritional status, and the presence of other acute illness,

such as pneumonia or need for mechanical ventilation.⁴⁻⁷ In general, PI patients comprise a medically complex population, the care of which requires a multifaceted approach for success.^{8,9} As a result, management of PI patients often requires input from multiple teams of clinicians with myriad specialties and areas of expertise.

Veterans with spinal cord injury (SCI) and PIs within the VA SCI System of Care are primarily managed by rehabilitation medicine physicians subspecialized in spinal cord injury medicine. General medicine practitioners are consulted to optimize chronic medical comorbidities such as hypertension or diabetes. Infectious disease practitioners are consulted for

Correspondence to: Devra B. Becker, MD, Louis Stokes Cleveland Veterans Affairs Medical Center, 10701 East Boulevard Cleveland, OH 44106, USA; Ph: 216-791-3800. Email: devra.becker@uhhospitals.org

antibiotic recommendations. General surgeons are consulted for soft tissue debridement and placement of diverting colostomies, while orthopedists are consulted for bony debridement. Wound care nurses provide dressing recommendations. Dieticians work to optimize nutrition for wound healing. Physical and occupational therapists manage biophysical modalities and optimize wheelchair seating. Plastic Surgeons are consulted for PI reconstruction. Multiple providers, each focusing on a small piece of the patient’s overall care, can lead to inadequate communication between consulting services, conflicting recommendations, and disparate treatment plans.

In order to overcome these challenges, we have assembled an interdisciplinary team at our large Veterans Affairs Hospital, dedicated to the care of patients with PIs in the SCI unit. The distinguishing features of this team, compared to other interdisciplinary care in the hospital and in SCI units at other institutions, are monthly bedside rounds to examine patients and formulate treatment plans, which include the patients themselves, and interdisciplinary journal clubs, in which team members from each specialty are given the opportunity to educate other members by sharing and discussing seminal papers in their field relating to the care of PIs. Participants include SCI physicians and nurse practitioners, surgeons from a variety of sub-specialties (general surgery, plastic and reconstructive surgery, vascular surgery, and orthopedics), nurses, infectious disease specialists, dieticians, wound care specialists, pharmacists, podiatrists, physical and occupational therapists, and representatives from the microbiology laboratory. There is no similar interdisciplinary team for patients with PIs outside of the SCI unit.

Relational Coordination (RC) is a theory of organizational performance which proposes that highly interdependent work is most effectively coordinated between workers through relationships of shared goals, shared knowledge, and mutual respect, supported by communication that is frequent, timely, accurate, and problem-solving.¹⁰ The RC survey is a tool to assess the quality of communication and relational dynamics between team members who are engaged in coordinating work. It measures four communication dimensions (frequent communication, timely communication, accurate communication, and problem-solving communication), and three relationship dimensions (shared knowledge, mutual respect, and shared goals). RC has been validated across many fields, including aviation,¹¹ criminal justice,¹² and a variety of health care settings;^{13–15} and high RC ratings have been found to correlate with improved performance. For example, hospitals with

high RC scores were associated with higher quality of care, reduced patient-reported postoperative pain, and shorter hospital stays in surgical patients.¹⁵ In the present study, we use the RC survey to compare care coordination among clinicians caring for PI patients inside and outside the SCI unit. We hypothesized that this interdisciplinary approach would lead to an improvement in treatment coordination among clinicians caring for patients with PIs.

Methods

In the present study, we applied the RC survey to the care of patients with PIs inside and outside the SCI unit in order to assess the impact of interdisciplinary rounding in the SCI on RC in the care of complex patients with PIs. Surveys were conducted anonymously, and no identifying information was collected. Survey questions are listed in Table 1. Groups that survey respondents were asked about included the primary SCI or medicine team, surgical specialties, infectious diseases, podiatry, laboratory medicine, nursing, pharmacy, ancillary services (physical therapy, occupational therapy, nutrition, etc), and other services. The survey was distributed to all the providers that were invited to participate in SCI multidisciplinary rounding, and respondents completed one set of questions for PI patients in the SCI unit and a second set of questions for PI patients outside the SCI unit. This study was considered to be exempt by the Institutional Review Board because surveys were anonymous and did not collect any identifiable information.

Table 1 Relational coordination survey questions.

Frequent communication	How <i>frequently</i> do you communicate with care providers in these groups about patients with pressure ulcers?
Timely communication	Do care providers in these groups communicate with you in a <i>timely</i> way about patients with pressure ulcers?
Accurate communication	Do care providers in these groups communicate with you <i>accurately</i> about patients with pressure ulcers?
Problem-solving communication	When problems arise regarding the care of patients with pressure ulcers, do care providers in these groups work with you to <i>solve the problem</i> ?
Shared knowledge	How much do care providers in these groups <i>know</i> about the work you do in caring for patients with pressure ulcers?
Mutual respect	How much do care providers in these groups <i>respect</i> the work you do in caring for patients with pressure ulcers?
Shared goals	How much do care providers in these groups <i>share your goals</i> for the care of patients with pressure ulcers?

Statistics

Responses were quantified on a 5-point Likert scale, with higher numbers corresponding to higher RC scores (1 = Never and 5 = Constantly, or 1 = Not at all and 5 = Completely, depending on context of the question). Missing data resulting from responders that indicated that they had no interaction with a specific care provider group for a particular metric were eliminated from the statistical analysis. Individual RC indices were averaged to calculate the overall index, as well as a communication index (based on the first 4 indices: frequent, timely, accurate, and problem-solving communication) and a relationships index (based on the last 3 indices: shared knowledge, mutual respect, and shared goals). Values were calculated for SCI patients and for non-SCI patients. We tested the overall index of RC for reliability using Cronbach's alpha, a test of index reliability based on inter-item correlation.

We assessed differences in RC in inside and outside the SCI using a two-tailed *t*-test. Statistical significance was established at $P < 0.05$.

Results

The survey was distributed to a total of 29 providers and received a total of 13 responses, constituting a

45% response rate. It should be noted that the 29 providers to whom the survey was distributed represented the widest possible audience of providers who were invited to participate in interdisciplinary rounds, and that the majority of non-responders consisted of providers that did not participate regularly. Respondents consisted of 5 SCI providers, 1 general surgeon, 1 plastic surgeon, 1 orthopedic surgeon, 1 infectious disease specialist, 1 wound care nurse, 1 nutritionist, 1 physical or occupational therapist, and 1 microbiologist (Fig. 1). In this survey, the term "SCI provider" refers to a heterogeneous group of practitioners that make up the SCI service, which is the primary service to which all SCI patients are admitted. These include physicians trained in Physical Medicine and Rehabilitation with or without subspecialty training in spinal cord injury medicine, as well as those trained in Internal Medicine without or without subspecialty training in spinal cord injury medicine. This group also includes physician extenders (nurse practitioners and physician's assistants) who are permanent members of the SCI service. Likewise, non-SCI hospitalists refer to the hospitalist teams that make up the primary service to which non-SCI patients with pressure injuries are admitted, which

Figure 1 Survey respondents according to specialty.

are largely made up of Internal Medicine trained physicians and the mid-levels that they oversee.

Cronbach's alpha was 0.890 for the overall index of RC, which exceeded the threshold of 0.700 recommended minimum level of index reliability. This indicates that there is a good to excellent level of internal consistency between answers to the individual items of the RC survey, making it statistically valid to average the components of the survey into a single overall index.

For overall RC, scores were statistically significantly higher inside the SCI compared to outside the SCI in interactions with primary providers (SCI providers for SCI patients and non-SCI hospitalists for non-SCI patients) ($P = 0.00012$), surgical specialties ($P = 0.028$), infectious diseases ($P = 0.029$), nursing ($P = 0.029$), and pharmacy ($P = 0.044$), as demonstrated in Fig. 2.

Results for communication RC closely resembled those for overall RC. Communication RC scores were statistically significantly higher inside the SCI compared to outside the SCI in interactions with primary providers ($P = 0.00012$), surgical specialties ($P = 0.033$), infectious diseases ($P = 0.019$), nursing ($P = 0.032$), and pharmacy ($P = 0.021$), as demonstrated in Fig. 3.

In contrast, analysis of relationships RC only demonstrated a statistically significant increase between SCI and non-SCI groups for RC scores in interactions with primary providers ($P = 0.003$), as demonstrated in Fig. 4.

Discussion

The delivery of integrated, interdisciplinary care has been a major goal among academic medical centers in

recent years.^{16,17} The benefits of interdisciplinary rounds on complex patients in the intensive care setting have been well-established, demonstrating improved mortality.¹⁸ While multiple studies have demonstrated the utility of interdisciplinary teams in PI prevention,^{19,20} comparatively little work has been done on the interdisciplinary management of patients who already have PIs. To our knowledge, the present study the first to address the effect of interdisciplinary rounds on relational dynamics in the setting of PI management.

Our study demonstrates that monthly interdisciplinary rounds in the SCI unit improve relational dynamics in interactions with a number of practitioners, including primary providers (SCI providers for SCI patients and non-SCI hospitalists for non-SCI patients), surgical specialties, infectious disease specialists, nursing, and pharmacy, as compared to lack of such interdisciplinary rounds in the care of patients with pressure injuries outside the SCI unit by hospitalists. Interestingly, the majority of this effect appears to be due to an improvement in communication RC (frequent, timely, accurate, and problem-solving communication), without significant improvement in the relationship aspects of RC (shared knowledge, mutual respect, and shared goals). This implies that, while interdisciplinary rounds encourage team members to communicate with one another more often and more effectively, it does not appear to have had an effect on the way that different specialists regard and understand one another. In addition to conducting bedside rounds, our team holds educational

Figure 2 Comparison of overall relational coordination among providers while caring for patients inside and outside the SCI unit. Error bars represent SD. ** $P < 0.01$; * $P < 0.05$.

Communication Relational Coordination

Figure 3 Comparison of communication relational coordination among providers while caring for patients inside and outside the SCI unit. Error bars represent SD. **P < 0.01; *P < 0.05.

journal clubs, in which team members from each specialty are given the opportunity to educate other members by sharing and discussing seminal papers in their field relating to the care of PIs. This educational aspect was developed with the intention to address the cultural divide between specialties, and more studies will need to be conducted to ascertain their effectiveness and to determine how they can be improved.

This was a small pilot study and, as such, had significant limitations. The number of health care providers surveyed was necessarily small, given the relatively small number of practitioners who are invited to SCI

rounds and the even smaller number who actually partake on a regular basis. As a result, our statistical power was limited. Furthermore, because this was a survey-based study, it is subject to the biases of the respondents. In this case, all respondents were regular SCI team participants and, having invested themselves in the SCI team, these respondents may have been biased toward answering in favor of interdisciplinary rounds. In the future, it would be interesting to compare survey results from practitioners who do not participate in SCI rounds. In the analysis, missing data resulting from responders who indicated that they had

Relationships Relational Coordination

Figure 4 Comparison of relationships relational coordination among providers while caring for patients inside and outside the SCI unit. Error bars represent SD. **P < 0.01; P < 0.05.

no interaction with a specific provider group for a particular metric were eliminated. It is unknown whether these represent interactions that should have taken place but did not, or whether there was no cause for interaction between the providers in question. If the former is case, elimination of these data points could have skewed the analysis toward high RC results. However, it should be noted that there was a larger number of missing data points in the non-SCI portion of the survey than the SCI portion, so if anything, RC results for the SCI population would have been more significantly better than for the non-SCI population had these missing data points been included.

RC has been validated across a variety of health care settings;^{13–15} and high RC ratings have been found to correlate with improved performance. Hospitals with high RC scores were associated with higher quality of care, reduced patient-reported postoperative pain, and shorter hospital stays in surgical patients.¹⁵ Despite this, it remains an indirect measure of quality of care. Future studies will need to be performed to track PI and rehabilitation outcomes in SCI and non-SCI patients to determine the true impact of SCI rounds.

Lastly, there are inherent differences between patients with and without SCI, and these differences may translate to differing needs in the care of those patients. While effective communication and positive relationship dynamics are goals in the care of every patient, it is possible that the difference in RC scores seen between these two patient populations may be the result of other factors inherent to the different patient populations, rather than the result of interdisciplinary rounds. In the future, it would be interesting to compare RC in a more randomized fashion.

Conclusion

In conclusion, the present study demonstrates that interdisciplinary rounds show promise as a means to improve coordination in the care of complex PI patients. However, further studies need to be performed in order to determine whether improvements in RC correspond to improvements in outcomes.

Disclaimer statements

Contributors None.

Ethics approval None.

Conflicts of interest We have no conflicts of interest to disclose.

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