

RURAL TRAUMA

Bianchi JD, Collin GR. Management of splenic trauma at a rural, level I trauma center. *The American Surgeon* 1997;63(6):490-495.

The purpose of this project was to examine the operative and non-operative management, associated injuries, and transfusion requirements of patients with splenic trauma at a rural Level I trauma center. The evidence from this study suggests that observation for splenic trauma is appropriate in many cases, as long as the surgeon is certain the spleen is not actively bleeding and the patient will not require a blood transfusion.

Bintz M, Cogbill, TH, Bacon, J. Rural trauma care: Role of the general surgeon. *The Journal of Trauma, Injury, Infection, and Critical Care* 1996;41(3):462-464.

The purpose of this review was to profile the trauma experience of a solo rural general surgeon working with patients with multiple injuries. According to the authors' findings, the roles of the general surgeon in the management of multiple trauma in the rural hospital are fourfold. Firstly, to coordinate trauma care in the community, including educational and organizational efforts. Secondly, to perform the necessary techniques in the ED to achieve optimal resuscitation and stabilization. Thirdly, to rationally prioritize patients for transfer to a referral trauma center based on assessment of patient injuries and institutional capabilities. Finally, to provide definitive care for a subset of patients with no need for subspecialty intervention.

Cone JB. Tertiary trauma care in a rural state. *American Journal of Surgery* 1990;160(6):652-654.

The objective of this project was to clarify the role of the urban trauma center in providing tertiary support for rural community trauma care. The authors identified three major areas of support that an urban trauma center can provide to supplement rural community hospital trauma care. These areas are 1) availability of surgical specialists, 2) critical care services, and 3) blood bank support. The trauma center and community hospital serving rural areas should not be competitors but should work together to avoid duplication of resources and still provide high-quality trauma care.

Hedges J, Adams A, Gunnels M. ATLS practices and survival at rural level III trauma hospitals, 1995-1999. *Prehospital Emergency Care* 2002;6(3):299-305.

The purpose of this analysis was to address the association of service delivery (process variables) to risk-adjusted survival in rural Oregon Level III trauma hospitals using a statewide trauma registry. The results showed that there was considerable variation in measured interventions among the 21 Level III hospitals. The authors concluded that although these findings are based on retrospective observations, the strong association of transfer to a higher level of care with survival of patients presenting with a GCS <9 and in patients with an ISS >20 but no hypotension suggests that identification of such patients who may benefit from early transfer will enhance this rural trauma system.

Helling TS. Trauma care at rural level III trauma centers in a state trauma system. *The Journal of Trauma, Injury, Infection, and Critical Care* 2007;62(2):498-503.

The objective of this study was to determine how Level III trauma centers compared with Level I and Level II centers in the Missouri trauma system and how trauma surgeon experience at these centers might shape future educational efforts to optimize rural trauma care. Based on a review of cases, the authors found that Level III trauma centers performed as expected in a state trauma system. Acuity and severity were lower as was corresponding mortality. There were few life-threatening head, chest, and abdominal injuries, providing a challenge to the rural trauma surgeon in maintaining the necessary skills to manage these critical injuries.

Koivunen D, Nichols WK, Silver D. Vascular trauma in a rural population. *Surgery* 1982;91(6):723-727.

This article provides a review of 89 cases of vascular trauma in a rural population seen at a rural university medical center during a ten-year period. The findings revealed higher amputation and complication rates than are usually experienced at urban centers. This appears to be related to the severity of injuries and the time lapse before initiation of definitive therapy.

Mann NC, Mullins RJ, Hedges JR, Rowland D, Arthur M, Zechnich AD. Mortality among seriously injured patients treated in remote rural trauma centers before and after implementation of a statewide trauma system. *Medical Care* 2001;39(7):643-653.

The purpose of this study was to evaluate risk-adjusted mortality in remote regions of Oregon before and after implementation of a statewide trauma system. The findings showed that increased injury survival after Oregon trauma system implementation, demonstrated in urban and statewide analyses, was not confirmed in remote regions of the state. The authors recommended that efforts to improve trauma systems in rural areas should focus on the process of care for head-injured patients transferred to higher designation trauma centers.

Norwood S, Fernandez L, England J. The early effects of implementing American College of Surgeons Level II criteria on transfer and survival rates at a rurally based community hospital. *The Journal of Trauma, Injury, Infection and Critical Care* 1995;39(2):240-245.

The purpose of this project was to determine the early effects of implementing the American College of Surgeon's (ACS) level II criteria at a rurally-based hospital that historically has provided trauma care to a large rural region of northeastern Texas. The results suggest that implementing ACS level II criteria in a rurally based referral hospital resulted in immediate increases in the number of critically injured patients and improvement in outcome in the most severely injured patients.

Oller DW, Rutledge R, Clancy T. Vascular injuries in a rural state: A review of 978 patients from a state trauma registry. *The Journal of Trauma, Injury, Infection and Critical Care* 1992;32(6):740-745.

The purpose of this review was to analyze the demographics, etiology, and outcome of vascular injuries in rural and urban populations. Data from this analysis suggest that rural vascular injury patients had a high incidence of blunt trauma, were older, were transported by helicopter more often, and were frequently referred from another hospital. In addition they had longer ICU, ventilator, and hospital stays and greater hospital charges and higher mortality compared with urban vascular trauma victims. The authors conclude that there is a need for the trauma care system to focus on earlier recognition, stabilization, and rapid transportation of this most seriously injured group of patients.

Rinker CF, Sabo RR. Operative management of rural trauma over a 10-year period. *The American Journal of Surgery* 1989;158:548-552.

The purpose of this paper was to review the management of trauma cases treated at a rural community hospital. The authors concluded that trauma system models that work in urban or suburban settings are not appropriate for rural areas. Given the decreased access to trauma services in rural areas, trauma surgeons should examine the distinct problems of rural communities and create models that will work in these environments.

Robertson R, Mattox R, Collins T, Parks-Miller C, Eidt J, Cone J. Missed injuries in a rural area trauma center. *The American Journal of Surgery* 1996;172:564-568.

This paper compares missed injuries in patients whose initial care was provided in rural community hospitals prior to transfer to a trauma center and in patients injured in an urban area and transported directly from the scene to the trauma center. The authors concluded that transferred patients with blunt injury have the highest risk for missed injury. Delayed transports and prior examination may contribute to complacency. All trauma patients must be repeatedly evaluated thoroughly and all diagnostic studies reviewed for adequacy.

Rogers FB, Ricci M, Caputo M, Shackford S, Sartorelli K, Callas P, Dewell J, Daye S. The use of telemedicine for real-time video consultation between trauma center and community hospital in a rural setting improves early trauma care: Preliminary results. *The Journal of Trauma, Injury, Infection, and Critical Care* 2001;51(6):1037-1041.

The purpose of this study was determine whether real-time visual and verbal communication using telemedicine during the initial evaluation and resuscitation of the trauma patient between trauma surgeons and the community hospital providers could improve community hospital trauma care. Preliminary results suggested that trauma telemedicine improves rural trauma care. With a fully functional trauma telemedicine system, the potential for improvement in the poor survival statistics of rural citizens exists with the early active involvement of the trauma surgeon in resuscitation and stabilization.

Rogers FB, Shackford SR, Osler TM, Vane DW, Davis JH. Rural trauma: The challenge for the next decade. *The Journal of Trauma, Injury, Infection, and Critical Care* 1999;47(4):802.

In this article, the recent literature was reviewed to highlight what is currently known and unknown about rural trauma and to provide some ideas of where to concentrate limited resources to improve the chance for survival and the care of the rural trauma patient. The authors suggest that improving the care of trauma patients in a rural environment requires that several important issues be addressed. First, a universal definition of what constitutes "rural" must be established. Second, data on rural trauma demographics and outcomes must be collected in a national database. Such a database will allow a needs assessment analysis of existing care in rural environments and facilitate planning and implementation of efficient systems of care. Finally, increased public awareness of problems unique to rural trauma is necessary.

Ruby B, Cogbill, TH, Gardner, RS. Role of the rural general surgeon in a statewide trauma system. *Bulletin of the American College of Surgeons* 2006;91(4):37-40.

The purpose of this study was to characterize the role of the general surgeon in trauma care, the experience in Wyoming was examined. The results of this survey show that general surgeons in rural Wyoming play a major role in the resuscitation and treatment of trauma patients. The authors conclude that the success of a statewide trauma system that depends on the skill, leadership, and commitment of general surgeons in large, rural areas.

Rutledge R, Fakhry SM, Baker CL. A population-based study of the association of medical manpower with county trauma death rates in the United States. *Annals of Surgery* 1994;219(5):547-563.

The purpose of this project was to assess the association between measures of medical manpower and the trauma death rate in U.S. counties. The results of this analysis showed that counties with more board-certified surgeons and more surgeons with an increased interest (AAST membership) or increased training (ATLS) in trauma care had lower per-capita trauma death rates.

Serleth HJ, Cogbill TH, Perri C. Pediatric trauma management in a rural Wisconsin trauma center. *Pediatric Emergency Care* 1999;15(6):393-398.

The objective of this project was to determine the results of pediatric trauma care managed in a rural setting with a cooperative effort by general surgeons and pediatric intensivists in comparison to national standards. The results from this review demonstrate that cooperation between general surgeons and pediatric intensivists can result in excellent pediatric trauma care in a rural setting.

Somasundar PS, Mucha P, McFadden DW. The evolving management of blunt hepatic trauma in a rural setting. *The American Surgeon* 2004;70:45-48.

The purpose of this study was to determine the applicability of non-operative management of blunt hepatic trauma to a rural setting. The findings of this review showed a definite trend toward non-operative management of blunt hepatic trauma in a rural setting over the past decade.

Weinberg J, McKinley, K, Peterson, SR, et al. Trauma laparotomy in a rural setting before transfer to a regional center: Does it save lives? *The Journal of Trauma, Injury, Infection and Critical Care* 2003;54(5):823-828.

The purpose of this study was to review the experience of regional trauma centers receiving rural trauma patients who have undergone emergency laparotomy before transfer to the regional trauma center. The results of this review of rural trauma patient cases demonstrated that patients with abdominal injury who underwent laparotomy at rural or remote facilities before transfer to definitive care had outcomes similar to those patients injured in an urban setting who were taken directly to a regional trauma center.

Zulick L, Dietz, PA, Brooks, K. Trauma experience of a rural hospital. *Archives of Surgery* 1991;126:1427-1430.

The purpose of this project was to evaluate the ability of a small rural hospital with level 2 trauma capability to provide adequate care to the patient with multiple trauma. The hospital treated a population with significant injuries, as evidenced by the mean ISS. Based on the review of the deaths from trauma in our study, the authors concluded that care of these patients after they arrived at the institution was comparable with care rendered at urban, level 1 trauma hospitals.