

Evacuation to a Trauma Center or a Non-Trauma Center? Is there any doubt?

Michael Stein MD*

Department of Surgery, Rabin Medical Center (Beilinson Campus), Petah Tiqva, Israel
Affiliated to Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel

Key words: trauma unit, evacuation, trauma system, trauma victim distribution

IMAJ 2006;8:134–136

The first Trauma Unit in Israel was founded at the Hadassah (Ein Kerem) Medical Center in 1992 – the result of increased awareness to the new concept of optimal care for the injured patient. This new concept emanated from a major paradigm shift that occurred during the last quarter of the twentieth century in North America. We have come a long way since the founding of the group called “ROLETA” (Doctors for Trauma) in the late 1980s, the introduction of the ATLS course (Advanced Trauma Life Support) in 1990 [1], and its adoption by the Scientific Council of the Israel Medical Association as a requirement for eligibility to obtain licensure following surgical residencies and their related subspecialties. Although the Ministry of Health has not yet officially designated centers to their various levels, this process is pending.

It is, in a certain respect, a matter of medical politics when one tries to assign the various acute care hospitals in Israel to levels of trauma care. Obviously we cannot adopt the North American classification to Levels I, II and III trauma centers. The reason is that *none* of the centers in Israel truly satisfy the requirements of the American College of Surgeons’ definition of a Level I Center laid out in the 1999 “Golden Book”** [2]: *Resources for Optimal Care of the Injured Patient*. In fact, the equivalent facilities in Israel were, traditionally, hospitals with a viable full-scale department of neurosurgery. So, we found ourselves in the late 1990s with six “Level I” trauma centers: one in the south, one in Jerusalem, one in Haifa, and three in the Dan district (Tel Aviv, Ramat Gan, Petah Tiqva). They were conveniently termed “Upper Level Trauma Centers,” as compared to other hospitals without neurosurgical departments, which were called “Regional Trauma Centers.” These “Regional” hospitals sometimes lack other important capabilities, such as cardiothoracic and invasive/interventional radiology units, important for the “optimal care for the injured patient,” so termed by the ACS. However, the Israeli Trauma Society, developing out of the original “ROLETA” group mentioned above, had other ideas as to what comprises a true “Level I” center. The cardinal requirement was a formal Trauma Unit with a full-time trauma director, a full-time trauma

nurse coordinator, an active and complete trauma registry, and a commitment on the part of the hospital management. This meant organization of a Trauma Team with “group call” activation for every victim of a major trauma arriving at the trauma resuscitation unit (Trauma Room). It also meant devoting a full month roster of on-call personnel to supervise the admission of unstable major trauma admissions even if they are not rushed to the operating room. Over the last 13 years, all six hospitals considered “upper level” trauma centers developed such capabilities. Moreover, practically all of them recruited formally trained trauma surgeons as their directors of trauma. Meanwhile, other “regional” trauma centers developed trauma units (four hospitals) with trauma surgeons as their trauma directors, although only one is searching for approval from the Ministry of Health for a full-scale neurosurgery department, to be eligible for “Upper Level Trauma Center” designation. Other hospitals, in which trauma units were not formed, were still considered by the Ministry of Health as “Regional” Trauma Centers but were not granted the recognition of the professional society. The reason for the Ministry of Health’s conviction was partially due to the geopolitical situation in Israel and the recognition that *all* hospitals in the country should be able to cope with the multiple casualty incidents that occur so frequently due to the Arab-Israeli conflict.

In spite of the hesitancy by the Ministry of Health to officially designate the hospitals as Trauma and Non-Trauma Centers, the emergency medical services as well as the military developed their own triage criteria. Over the years they arrived at the point where severely injured trauma patients were being evacuated primarily to the “upper level” trauma centers, mostly cases of single trauma patient incidents. This was again according to the concept of the “Golden Book” – namely, to transfer the trauma victim to the closest *appropriate* hospital (Level I in the event of Major Trauma). There were even guidelines as to which mechanisms and initial physiologic presentation should prompt the paramedics to head for a Level I trauma center if possible. The gradual development of the trauma system in Israel resulted in practical terms in four types of hospitals dealing with trauma: a) the “upper level” trauma center, comprising six centers; b) regional trauma centers with a formal trauma unit – four centers; c) regional hospitals that receive relatively large numbers of trauma victims but have no formal trauma

* Dr. Stein is chairman of the Israel Trauma Society

** So called by traumatologists, both because of its value and its yellow cover.

ACS = American College of Surgeons

units – seven to eight centers; and d) small hospitals that receive major trauma patients only occasionally and transfer most of them to a higher level trauma center. As mentioned above, it has been argued that due to our geopolitical situation, with multiple terror attacks and the perpetual threat of full-scale war, all hospitals should be kept on alert and should retain their trauma care experience (i.e., to continue treating trauma patients on a regular basis and not divert trauma patients to officially designated “upper level” centers). However, if by so doing we compromise care for the individual everyday trauma victim, this practice is unjustified. Even during 2002, the worst terror-stricken year, the total number of trauma patients admitted to hospitals was about 4% of all trauma admissions. Even in a situation like that, when multiple casualty incidents occur, distributing victims to as many hospitals as possible while attempting to triage the more seriously ill to designated trauma centers results in the best outcome. Full-scale wars with thousands of trauma victims, occurring every 10 years or so, cannot justify compromising the care of the average severely injured victim during peacetime.

Level I versus Level II

What is the difference in Israel between Level I (upper level trauma centers) and Level II (regional) trauma centers? Well, one should first define the Level II trauma center. Is it the hospital that has a formal trauma unit with a dedicated staff and trauma team, or is it the center within the broader definition of the Ministry of Health? Hospitals falling into the Level II category are those lacking the “24/7” neurosurgery capability, as well as advanced cardiothoracic and sometimes 24/7 interventional radiology.

There is no doubt that for non-severe, stable, traumatic injuries, excellent care can be provided in every decent medical center that has a cadre of experienced emergency physicians, general surgeons, orthopedic surgeons and intensive care physicians. They only need a proper admitting area in the Emergency Department, appropriate imaging modalities, availability of operating rooms and staff, and postoperative intensive care. Most acute care hospitals in Israel have these capabilities, except for significant head injuries that need secondary transfer to an appropriate facility with neurosurgical capabilities. The premise underlying the process of regionalization of trauma care is that the concentration of care in relatively few dedicated centers will increase institutional volume and experience. Though still debatable, several studies have supported this hypothesis that Trauma Centers need an annual major trauma volume of at least 200 per year [3] or, according to another source, at least 650 per year [4]. Since the number of major trauma patients (~12% of all trauma admissions) in most “upper level” trauma centers in the country fluctuates between 250 and 400 patients, it complies with the requirements set by the “Golden Book” [2]. However, recent studies define the minimal volume at 650 [4], which not one of our hospitals can reach. Other studies were less conclusive and showed no variations in survival of major trauma victims with respect to volume of trauma victim load

[5]. It has also been shown that there is no predictive value for the number of major trauma patients treated by any single trauma surgeon [6]. Most studies will use the survival rate, per admissions, of major trauma [3–6] as a parameter of quality of care. Others use, in addition, length of stay as a measure for quality of care. In a recent article from Los Angeles, Demetriades and co-authors [7] presented the results of the National Trauma Data Bank study of the ACS. This is the largest registry ever assembled, with over one million prospectively collected patient records from various trauma level centers. Demetriades claimed that Level I centers had significantly lower mortality rates and significantly lower severe disability at discharge of major trauma patients than Level II centers. Subgroup analysis showed that cardiovascular injuries and major liver injuries fare better in Level I centers than Level II centers. The difference was even more significant in the subgroup of complex pelvic fractures. Interestingly, the volume of trauma patients as suggested by the ACS optimal requirements book [2] did not make a difference.

The situation in Israel is somewhat different since the Level II hospital in North America is not comparable to the “Regional” trauma center in Israel. What is quality of care when talking about trauma patients in Israel? Is it the in-hospital critical mortality rate (death rate from major trauma)? Is it length of stay for various injuries and injury severities? Or is it the functional status of injured patients after rehabilitation? One can add the newly valued (by hospital administrators) parameter of patient and family satisfaction in this modern – “client” rather than “patient” – medical environment.

Is there any more doubt?

It has been proven that mortality has dropped significantly for major trauma patients arriving alive to hospitals in the developing trauma system in Israel [8]. Of course, the development of the trauma system in Israel involved fundamental changes in the concept of initial care in the field. It had a major impact on the emergency medical services (Magen David Adom) and its evacuation protocols, as well as the development of trauma units with activated trauma teams ready to perform rapid initial assessment for the seriously injured unstable trauma patient, be it from a penetrating or a blunt mechanism. All these had their share in the reduction of critical mortality shown by the Israeli National Trauma Registry. However, the major change in the way we receive major trauma victims today in hospitals with dedicated trauma units is that the trauma team is waiting for the critical patient and not the reverse.

Most patients will survive and heal no matter where they are taken and whether or not they are examined or treated in a timely fashion. However, there are a few severely multiply injured trauma victims who depend on a well-organized trauma team that will admit them in a timely and appropriate manner. They need an experienced trauma surgeon to conduct the orchestra of various subspecialties that will provide optimal care for the seriously ill. Only in this way can we expect to save all those who are potentially salvageable.

The quality of care with respect to the multi-traumatized patient does not end with the initial care in the emergency department, operating room, and intensive care unit. If there is no functional trauma service, patients hospitalized in a certain department will lack the timely coverage of other subspecialties needed for their other injuries. Until we have designated trauma departments, this problem will continue and we will need someone (a trauma director) to coordinate all aspects of care for these complicated patients.

Israel is a small country. The distances are short and the evacuation time, from any point, is relatively short to any of the hospitals with dedicated trauma units. Although it has not yet been proven scientifically, there is ample evidence from abroad that severely injured patients will benefit from being transferred to designated trauma centers. Those with significant head injuries or combined multi-system injuries will fare better if they are evacuated directly (or transferred from a smaller hospital) to the six "upper level" trauma centers.

Hospitals in Israel that have no dedicated trauma units imply that their management did not regard these as a high priority issue. They chose to develop and promote other fields of medicine. This is acceptable as long as they understand that hospital management dedication for the cause is the single most important factor for the success of any field the hospital chooses to promote. These hospitals should *not* be on the list of the emergency medical services for evacuating major trauma patients. It is encouraging to note that in spite of medical politics the common practice of the emergency services in the field follows this logic. During the last 15 years of the development of a trauma system in Israel, evacuation practices have changed.

Today they bring a larger number of major trauma victims to appropriate facilities – namely, trauma centers with dedicated trauma units that can provide optimal and timely care.

References

1. Ben Abraham R, Stein M, Kluger Y, et al. Israel's ATLS program: summary and outlook. *Harefuah* 1998;134(5):416–18 (Hebrew).
2. American College of Surgeons Committee on Trauma. Resources for Optimal Care of the Injured Patient, 1999. Chicago: American College of Surgeons, 1998.
3. Smith RF, Frateschi L, Sloan EP, et al. The impact of volume on outcome in seriously injured trauma patients: two years' experience of the Chicago trauma system. *J Trauma* 1990;30:1066–76.
4. Nathens AB, Jurkovich GJ, Maier RV, et al. Relations between trauma center volume and outcomes. *JAMA* 2001;285(9):1164–71.
5. Glance LG, Osler TM, Dick A, Mukamel D. The relation between trauma center outcome and volume in the National Trauma Databank. *J Trauma* 2004;56(3):682–90.
6. Margulies DR, Cryer HG, McArthur DL, et al. Patients' volume per surgeon does not predict survival in adult Level I Trauma Centers. *J Trauma* 2001;50(4):597–601;discussion 601–3.
7. Demetriades D, Martin M, Salim A, et al. The effect of trauma center designation and trauma volume on outcome in specific severe injuries. *Ann Surg* 2005;242(4):512–19.
8. Peleg K, Aharonson-Daniel L, Stein M, et al. Increased survival among severe trauma patients: the impact of a national trauma system. *Arch Surg* 2004;139(11):1231–6.

Correspondence: Dr. M. Stein, Director of Trauma Services, Dept. of Surgery, Rabin Medical Center (Beilinson Campus), Petah Tiqva 49100, Israel.

Phone: (972-3) 937-7043

Fax: (972-3) 937-7042

email: mshtein@clalit.org.il