SPINAL CORD INJURIES
A REVIEW OF THE EARLY TREATMENT IN 300 CONSECUTIVE CASES DURING THE KOREAN CONFLICT

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This report is based on the early phases of treatment of 300 consecutive patients with spinal injuries at the Tokyo Army Hospital from September 1950 to May 1952.† Of these patients 254 were United Nations battle casualties from Korea with penetrating wounds of or about the vertebral column with neurological involvement (Table 1). The remaining 46 had closed injuries similar to those encountered in civilian localities (Table 1). All statistics herein presented were compiled in Tokyo and include a few casualties from Korea that were not treated at mobile neurosurgical units as well as some casualties from accidents in Japan. The patients who died in Korea on the battlefield or at medical installations there are not included.

TABLE 1
Vertebral level and type of injury

<table>
<thead>
<tr>
<th>Level</th>
<th>Penetrating Wounds</th>
<th>Closed Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical</td>
<td>96</td>
<td>19</td>
</tr>
<tr>
<td>Thoracic</td>
<td>135</td>
<td>17</td>
</tr>
<tr>
<td>Lumbar</td>
<td>74</td>
<td>10</td>
</tr>
<tr>
<td>Sacral</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>254</td>
<td>46</td>
</tr>
</tbody>
</table>

TREATMENT

The aim of treatment during this early phase of paraplegic care (average 4–6 weeks) was to salvage as much neurological function as possible and to prevent the formation of decubitus ulcers and other complications that may retard a rehabilitation program. The mortality rate in this series was 1 per cent.

As soon as the patient reached an equipped medical facility a complete physical examination was done, as penetrating wounds of the spinal cord

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† The following officers were associated with the author in the care of the casualties on which this report is based: Lt. Col. Arnold M. Meirowsky, M.C., Neurosurgical Consultant, Far East Command, Samuel Atkins, Joseph C. Barnett, Edward J. Bishop, Robert A. Clark, Philip R. Dodge, Griffith R. Harsh, III, George J. Hayes, Milan Leavens, John B. Moyar, Jose Ninecurt, Richard R. Patterson and Paul R. Rosenbluth.
were frequently associated with damage to additional areas. Of the 254 patients with penetrating wounds of the spine 87 (34.25 per cent) had associated chest wounds with hemothorax and/or pneumothorax, 23 (9.05 per cent) had bowel perforations requiring colostomy, 11 (4.33 per cent) had retroperitoneal hematomas without bowel perforations, 10 (3.93 per cent) had perforations of the liver, and 9 (3.54 per cent) had lacerations of the kidney requiring unilateral nephrectomies. Other associated injuries and complications were also present, bringing the total to 194 associated injuries in 164 of the 254 patients who had penetrating wounds of the spine. It is to be noted that some patients had multiple associated injuries. Some of the complications were discovered at a later date, showing the value of an initial and repeated physical examination at frequent intervals. While an injury causing compression of the spinal cord may be considered a surgical emergency, other procedures of a life-saving nature take precedent, and laminectomy may of necessity be delayed several days.

With few modifications the patients in this series received the same treatment as was advocated by many neurosurgeons towards the end of World War II. In addition to performing laminectomies on all patients with penetrating wounds of the spine, early laminectomies in all cases of closed injuries with fracture-dislocation were also done. Decubitus ulcers were prevented by turning the patient every 2 hours, either by using the double-litter method or the Stryker frame. This turning was also continued during air evacuation of the patient back to his homeland. No suprapubic cystostomies were done. Dietary restrictions were practically eliminated by starting early ambulation. Most all of the patients with thoracic or lumbar injuries were fitted with metal long back-braces and started on a sitting-up program on the 10th postoperative day. Plaster of Paris or body casts of other material were not used because they were not deemed necessary for stability and their presence would have made temperature regulation and skin care practically impossible. Whole blood transfusions were given when indicated and no blood substitutes such as plasma were used. The availability of the newer mycin antibiotics and the disc method of culture and sensitivity studies made the treatment of infections much easier than in previous wars. We encountered practically no difficulty with wound healing or infection in those patients who received initial debridement, laminectomy and primary closure of the wound, even at 48–72 hours after injury. Bladder infections were the exception rather than a common finding. The McKenna type of tidal drainage apparatus was used. At times a chest tap for evacuation of a hemothorax or pneumothorax would be followed immediately by a laminectomy.

NEUROSURGICAL INTERVENTION

It may be seen in Table 2 that of the 249 patients with penetrating wounds who had laminectomies, only 44 (17.67 per cent) were operated upon within 24 hours of injury. Of the patients with closed injuries, 17 (56.66 per