CP-599

SPINAL CORD INJURY TRANSPORT SYSTEM

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SUMMARY

The United States Air Force Air Mobility Command (AMC) is tasked to provide the aeromedical evacuation of casualties in routine and contingency operations. To carry out this mission, AMC needs a medical support system suitable for transporting patients with spinal cord injuries and all types of extremity and cervical traction requirements. This piece of equipment would be a Spinal Cord Injury Transport System (SCITS). The current method for transporting these patients is on the Stryker Turning Frame with a Collins Traction Device, for cervical traction. The system has been in use for over 20 years and is no longer logistically supported and must be replaced. The replacement system should provide a quality of care comparable to that available in fixed (ground) medical treatment facilities; i.e., a system that provides traction and kinetic therapy through incremental side-to-side rotation. Although SCITS will primarily be used for the previously mentioned patients, it would be beneficial and used for a variety of other patient conditions such as multiple trauma, burns, chest wounds, pulmonary complications, and post operative, depending on availability.

NEW PROGRAM

In 1992, AMC Surgeon General drafted a mission need statement to respond to a medical deficiency noted in the transport of spinal cord injury and trauma patients. AMC directed the Human Systems Center to develop a replacement system for the Stryker turning frame which is no longer is logistically supported. A formal acquisition program was developed at the Human Systems Program Office (SPO). SCITS is a joint service patient movement item and the SPO works closely with the Defense Medical Standardization Board. The SCITS integrated product team is dedicated to developing an improved spinal cord injury and trauma transport system that provides quality care comparable to that available in medical facilities.

CURRENT STANDARD OF CARE

The Stryker turning frame has been the method of choice for transport of spinal cord injury patients. We are able to position the patient either prone or supine, very limited and uncomfortable for the patient. The Collins traction device provides the patient with cervical traction in two pound increments up to sixty pounds. The Stryker Turning Frame is no longer manufactured, replacement parts must be custom manufactured, are costly, and require a long lead time to procure. The Collins traction Device is also no longer manufactured, spare parts for the device are not available from any source. Consequently we need a new piece of equipment to move the patient as soon after injury as possible.

SPINAL CORD INJURY TRANSPORT SYSTEM (SCITS)

The SCITS will provide a mechanism for safe movement of the spinal cord injury patients, from time of injury to final destination hospital via aeromedical airlift. The system performance capabilities required of the SCITS include the following:

a. Support Surface: firm, padded surface, rigid enough to allow administration of cardiopulmonary resuscitation, and shall have adjustable restraint devices that minimize patient movement during transport and side-to-side rotation.
b. Side-to-Side Rotation: shall provide incremental, side-to-side surface rotation, that is effective in preventing pulmonary, cardiovascular and skin breakdown complications.

Paper presented at the AGARD AMP Symposium on "Aeromedical Support Issues in Contingency Operations", held in Rotterdam, The Netherlands, 29 September - 1 October 1997, and published in CP-599.

c. Trendelenburg/Reverse Trendelenburg: shall provide the capability to elevate and lower the patient's head or feet 15 degrees
d. Integrated Traction: shall be designed to maintain constant force traction while the surface rotates side-to-side, with the amount of traction in 5 pound increments from 0-65 pounds. Cervical, upper and lower extremity traction shall be provided and will be acceleration independent.
e. Accessibility to Patient: medical personnel shall have the capability to easily perform routine and emergency nursing care. The surface shall provide access to the occipital, thoracic, and rectal areas to perform patient care without removing the patient from the surface or compromising the stability and alignment of the spine.
f. Radiolucent Surface: shall be designed to allow X-rays to be taken of the entire vertebral column, chest, and lower abdomen of the patient without removing them from the surface.
g. Integration into Aircraft/Vehicles: shall fit into Air Force and Army aeromedical evacuation aircraft. Shall also fit into both Department of Defense and civilian rear loading ambulances and ambuses.
h. Accessories: shall provide accessories capable of being stored within the SCITS, that are necessary to prevent foot drop, relieve pressure on the brachial nerve plexus and ulnar nerve at the elbow, that accommodate a standard orthopedic plastic bed pan, urinary drainage tube, chest drainage tube and an intravenous pole.
i. Federal Aviation Administration (FAA): Certification shall conform to FAA safety regulations for carry-on medical devices.
j. Food and Drug Administration (FDA) Approval: shall be certified to comply with the requirements on the FDA for medical devices.
k. Human Factors (user friendly): shall be ergonomically designed to assist aeromedical crews in the treatment and transportation of spinal cord injury and multiple trauma patients.

ROUTINE AND CONTINGENCY OPERATIONS

The SCITS will serve as a forward deployed patient movement item for use during routine medical situations and in contingency operations. SCITS employment in routine aeromedical evacuation operations, would be to transport military members with unstable spinal injuries to facilities capable of providing the required treatment. In this scenario, the patient would be placed on SCITS in a controlled hospital environment. Traction would be incorporated as the patient is placed on the SCITS and would remain in place until the patient reached their final destination and definitive treatment such as spinal fusion can be accomplished. This transport phase will be relatively quick.

During a contingency the idea is for safe transport of the spinal cord injury patient from the Combat Zone to the Communication Zone and on to the continental United States. The patient would be placed on the SCITS in the austere environment of the field hospital in the third echelon. The patient can then expect to move from one echelon of care to another by ground or air transportation, and may take up to 15 days to reach the final destination medical treatment facility. SCITS must be able to accommodate the patient transport periods established by the movement protocols. Due to the requirement to employ SCITS in the field environment it should be understood that any transport of the SCITS will involve a combination of rolling and lifting to move the unit and patient from a treatment area to ground transportation, and then ground transportation from the treatment facility to the landing zone or flight line where the patient is again lifted and carried on the SCITS to the aircraft and secured in a litter stanchion to prevent inflight movement of the unit. Throughout movement phases - traction, lateral rotation, and Trendelenburg/Reverse Trendelenburg capabilities will be required.

CONCLUSION

The development of a Spinal Cord Injury Transport System will do much to improve the medical treatment provided injured personnel during aeromedical evacuation.

REFERENCES

Draft Joint Operational Requirements Document, AMC-USA-USN 013-92-I/II, Spinal Cord Injury Transport System, Revision I,
25 Aug 97.