Challenges Encountered in Surgical Management of Spine Trauma in Morbidly Obese Patients

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Physicians at Monash University and The Alfred Hospital in Melbourne, Australia describe the logistic, medical, and societal challenges faced in treating spine trauma in morbidly obese patients. Based on a case series of six patients injured in high-speed motor vehicle accidents, the authors categorize difficulties faced in the care of morbidly obese patients from on-scene immobilization and medical transport through spinal imaging, surgery, and postoperative care. Details of the six cases and a thorough discussion of challenges posed by morbid obesity and possible solutions are covered in "Challenges in the surgical management of spine trauma in the morbidly obese patient: a case series. Clinical article," by Hannah E. Rosenfeld and colleagues, published today online, ahead of print, in the Journal of Neurosurgery: Spine [1].

The obesity epidemic is spreading worldwide. When patients who are morbidly obese suffer spinal injury or other major trauma, they face greater risks of complications and death compared with non-obese individuals.

The patients described in this article—five women and one man, ages 18–69 years—ranged in weight from 276 pounds (125 kilograms) to 410 pounds (186 kilograms). All six patients had a body-mass index greater than 40. These particular patients were selected because of the problems posed by their large body mass before, during, and after spine sugery.

The authors describe each case separately and then break down the obstacles faced during care of these patients into separate categories, specifically

- Transport and transfer. Hailing from Australia, the authors are well aware of difficulties in transporting trauma victims from rural areas to tertiary trauma hospitals. At times, air ambulances may be the optimal choice, but these helicopters and planes have limited cabin sizes and/or weight capacities that can exclude conveyance of morbidly obese patients. This necessitates travel by road, which significantly delays diagnosis and treatment, and can have a deleterious effect on outcome. The use of a cervical collar during transport may be complicated by the large circumference of the patient's neck. Alternative stabilizers, such as sandbags and head taping, may be required.
- Anesthesia and resuscitation. Intubation is difficult because the anatomy makes it difficult to identify internal structures. Once intubation has been achieved, the endotracheal tube may become easily dislodged. Mechanical ventilation is problematic. Because of excess subcutaneous tissue, intravenous or intra-arterial access is difficult, as is placement of a draining tube in the urinary bladder. Monitoring of blood pressure and heart function

is not always accurate in these patients.

- Imaging. Preoperative and intraoperative imaging is more difficult in morbidly obese patients. Some patients are too large to fit comfortably in closed MRI magnets. Expansive adipose tissue results in poor x-ray penetration and unclear CT and MRI images. In attempts to obtain better images, the patient may be subjected to greater radiation doses.
- Surgical positioning. The researchers point out that standard operating tables may not be wide enough or strong enough to hold morbidly obese patients. Turning these patients and transferring them to another table can be challenging and potentially harmful to the staff. Positioning these patients on a spinal frame may be difficult, because they may exceed the size limits of the frame.
- Surgical approaches and techniques. As mentioned earlier, intraoperative imaging is not as dependable in morbidly obese patients. Localization of spinal levels is thus much more difficult. Due to the depth of subcutaneous fat in these patients, the authors state that a longer incision may be necessary and longer instruments required. Retraction can be difficult, and harvesting of bone autografts may pose technical challenges and greater risks of morbidity.
- Venous problems. There can be greater venous bleeding, impaired venous return of blood to the heart, and increased events of venous thromboembolism.
- Postoperative wound care and pulmonary care. Morbidly obese patients face a higher incidence of wound breakdown, surgical site infection, and pressure sores than patients of lower weight. They should also be monitored to ascertain if those with cervical spine injuries are at risk for aspiration.

In addition to alerting other physicians about the many obstacles impeding quick and efficient health care in morbidly obese patients with spinal injuries, the authors offer commonsense suggestions for how to overcome many of the obstacles they describe. Some examples include: fashioning makeshift cervical collar extenders; increased vigilance in monitoring airways; use of open MRI units when available; clamping together two operating tables when a large table is not available; using hoist systems in the operating room and training staff in moving obese patients; selecting nonstandard surgical approaches, when appropriate, to provide adequate access to the spine while allowing morbidly obese patients to be positioned safely for the entire operation; creation of longer surgical instruments; additional use of Cell Saver, which lessens overall blood loss during surgery; adjusting the dose of prophylactic heparin; and use of adequately sized pneumatic calf compressors. The authors also suggest that new hospital guidelines and management techniques should be developed to improve overall outcomes in obese patients, as their number is on the rise.

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