Urgent endovascular stenting of subclavian artery pseudoaneurysm caused by seatbelt injury

Hassan Adnan Bukhari, MD;† Roger Saadia, MD;† Brian William Hardy, MD†

Subclavian artery injury in blunt trauma is uncommon. The surgical repair of such an injury can be a major challenge. Because penetrating injuries are more common, many trauma surgeons have relatively little experience in dealing with blunt subclavian artery injury. This case is the first report of acute or immediate endovascular repair with pseudoaneurysm stenting of the subclavian artery, as a result of seatbelt injury, in the presence of clavicular fracture and neurological deficit.

Case report

A 45-year-old woman who was a restrained frontal passenger in a motor vehicle accident was transferred to our institution from a community hospital with a potential major thoracic vessel injury. She was alert, oriented and hemodynamically stable. Physical examination revealed a right supraclavicular hematoma. Her blood pressure and pulse were diminished on the right. Neurological examination revealed the presence of Horner’s sign on the right, with no other neurological deficit. A chest radiograph showed a left pneumothorax, a widened mediastinum with a right pleural cap and a displaced fractured right clavicle; the “scout view” of the computed tomography angiography (CTA) of the chest showed the same findings. CTA of the chest showed a right subclavian artery pseudoaneurysm measuring 22 × 17 mm with no extravasation. A chest tube was inserted for the pneumothorax. The patient remained hemodynamically stable. Angiography was done to evaluate the thoracic aorta and its branches. An arch aortogram demonstrated a normal thoracic aorta with a right subclavian artery pseudoaneurysm immediately distal to the origin of the right internal mammary and vertebral arteries (Fig. 1). Due to the close proximity of the aneurysm to the origin of the right vertebral artery, the right vertebral artery might have had to be sacrificed to treat the aneurysm by endovascular means. A subsequent left vertebral artery angiogram demonstrated a large patent left vertebral artery. At this point, it was decided to proceed with endovascular exclusion of the false aneurysm. With the use of a 38-mm Jostent, the pseudo-aneurysm was successfully excluded from the circulation with persistent flow identified in the right internal mammary and the right vertebral artery (Fig. 2). The pulses in both upper extremities became equal. After 2 months, the stent remained patent, and

References

no neurological deterioration was noted. The fracture of the clavicle was treated conservatively.

Discussion

Subclavian artery injuries are rare and occur in 3% of penetrating injuries to the neck. Blunt injuries account for 2% to 3% of all reported subclavian artery injuries. In the largest published series of subclavian artery injuries, 2 of 93 cases were secondary to blunt injury. The mortality rate reached 61% in some series.

The close anatomic relation of the subclavian artery, clavicle and brachial plexus makes the surgical option more difficult and carries a high risk of neurological and vascular injuries. There are 2 treatment modalities for managing this kind of injury. The surgical management is the standard option in unstable patients but remains a difficult approach and carries a high morbidity. The exposure of the subclavian artery is especially problematic. It can be done either by supraclavicular approach with clavicular resection or medial sternotomy with supraclavicular extension for good exposure of the proximal subclavian artery. As with any surgical intervention, it has a potential risk of subclavian vein and brachial plexus injuries. The reported mortality in some series ranges between 10% and 30%. In addition, it carries a high risk of major bleeding.

Widespread use of endovascular stent treatment of vascular injuries has become an acceptable and less invasive alternative to surgical repair in subclavian artery injury. There are 6 reported cases of endovascular stent placement for subclavian artery injury: 5 from Europe and 1 from the United States. Four of these were diagnosed 10 days, 5 months, 3 years and 30 years after the initial traumatic event. The case from the United States reported the endovascular management of subclavian artery injury in an acute setting, with the absence of clavicular fracture or any neurological deficit. Our case could represent the first Canadian report of urgent endovascular stenting of the subclavian artery pseudoaneurysm in the presence of displaced clavicle fracture (which was treated conservatively) and neurological deficit caused by seatbelt injury.

In summary, subclavian artery pseudoaneurysm is rare but carries a high mortality rate. Endovascular stent placement is a promising and less invasive alternative to surgery and potentially carries a lower morbidity and mortality rate. A large series with long-term follow-up comparing endovascular stenting with surgical options, especially in the presence of displaced clavicular fractures and neurological deficits, is needed.

Competing interests: None declared.

References