the decision was made to carry out another immediate hemostatic procedure.

During the pauses between chest compressions, access to the superior mediastinum was achieved through cervicotomy, and deep blunt dissection was performed with the surgeon's finger along the anterior surface of the trachea. The brachiocephalic trunk was palpated and bluntly dissected at its origin (Figure 1) to prevent injury to the recurrent nerve, and a Satinsky clamp was blindly placed across the artery to stop hemorrhage, thus allowing time for resuscitation and stabilization (Figure 2). When spontaneous return of circulation was observed, evacuation of blood and pleural clots and hemostasis by manual compression of the bleeding point were successfully car-

ried out through the thoracotomy in the operating room (Figure 3). During the thoracotomy procedure, jet bleeding from the subclavian artery was observed to stop on closure of the clamp, which evidenced the efficacy of this procedure.

Although to our knowledge this surgical maneuver has not been described before, it was successfully applied to achieve temporary hemostasis of the bleeding point in a life-threatening situation. We consider this technique to be safe and easy to apply by surgeons with expertise in general thoracic or cardiovascular procedures. We therefore postulate that it could be a useful tool for trauma surgeons to control bleeding of the upper right thoracic region or upper limb.

EDITORIAL COMMENTARY

Emergency transcervical innominate artery clamping: Is it a real option?

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Disclosures: Author has nothing to disclose with regard to commercial support.

Received for publication Dec 24, 2015; accepted for publication Dec 30, 2015; available ahead of print Feb 6, 2016.

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J Thorac Cardiovasc Surg 2016;151:1425-6

0022-5223/\$36.00

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<http://dx.doi.org/10.1016/j.jtcvs.2015.12.047>

Traumatic hemorrhage from the right innominate or subclavian arteries poses a significant challenge for cardiothoracic and trauma surgeons. Traditional surgical repair involves immediate median sternotomy or selective use of supraclavicular or infraclavicular incisions.^{1,2} During the last 2 or 3 decades, endovascular repair of thoracic vascular injuries has improved outcomes and reduced the number of patients requiring surgical repair.^{3,4} Yet some patients still require acute surgical control of right innominate or subclavian artery hemorrhage.

In selected cases, access to the superior mediastinum may be available from the low central neck (patients with neck injuries or tracheostomy and other incisions). In these patients, digital compression of the innominate artery in the mediastinum anteriorly against the sternum may reduce

Mediastinal anatomy affects the ability to clamp the innominate artery blindly.

Central Message

Control of subclavian hemorrhage can be obtained by blind transcervical vascular clamping of the innominate artery in the mediastinum.

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blood loss until a sternotomy can be performed, although in my personal experience maintaining effective pressure for the full time necessary can be challenging. In their article in this issue of the *Journal*, Perez and colleagues⁵ report the case of a woman who developed an iatrogenic right hemothorax after central jugular venous catheter placement and whose repeated cardiac arrests prevented prompt transfer to the operating room for definitive repair. During resuscitative efforts in the intensive care unit, Perez and colleagues⁵ used a novel maneuver that allowed them to

FIGURE 1. Mediastinal and thoracic inlet anatomy. A, Sternal artery and sternal spine distances are short (8 mm/44 mm) and thus less favorable. B, Sternal artery and sternal spine distances are longer (11 mm/66 mm) and thus more favorable.

clamp the innominate artery blindly through a cervical incision. Dissection was quickly performed in a manner similar to mediastinoscopy, and a Satinsky vascular clamp was placed blindly on the innominate artery, providing reasonable hemostasis until definitive repair was possible.

The described maneuver proved to be ingenious, timely, and lifesaving—worthy of consideration in these life-threatening situations. As with most surgical maneuvers, however, there are caveats. First, the performance of this maneuver should never delay transport of an otherwise stable or semistable patient to the operating theater or angiography suite for definitive repair. Second, appreciation of the anatomy is crucial for the safe application of this procedure. The innominate vein just anterior to the artery innominate (not shown in Figure 3 of Perez and colleagues⁵) may easily be injured in rapid dissection of this area, significantly compounding the vascular injury requiring repair. Third, unfavorable anatomy may prevent placement of such a clamp. With an extensive personal experience with extended mediastinoscopy, I have noted that access to the innominate artery in patients with small thoracic inlets may be extremely challenging, if not impossible, even for the most experienced thoracic surgeons (Figure 1). Furthermore, dense fascia may be encountered along the aorta and innominate artery in some patients, making *quick* dissection of this area hazardous.

In summary, expeditious placement of a vascular clamp on the innominate artery through a cervical incision by experienced surgeons in suitable candidates can be lifesaving in specific emergency situations. Clearly this procedure is most appropriately performed by cardiothoracic surgeons and possibly selected experienced trauma surgeons. Regardless of the surgeon, however, performance of the described maneuver should be completed quickly and easily and facilitate resuscitation; it should never be prolonged or allowed to compromise the patient's definitive arterial repair (whether open or endovascular) or the patient's chance of survival.

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