Case Report

A prehospital use of ITClamp for haemostatic control and fixation of a chest tube

S. Barnung1 and J. Steinmetz2
1Emergency Medical Services, The Capital Region of Denmark and Department of Anaesthesia, Centre of Head and Orthopaedics, Rigshospitalet, Copenhagen, Denmark and 2Trauma Centre and Department of Anaesthesia, Centre of Head and Orthopaedics, Rigshospitalet, Copenhagen, Denmark

We here present three cases in which a new device, the ITClamp Hemorrhage Control System (Innovative Trauma Care, Inc., Edmonton, Canada), was used for bleeding control and for securing a chest tube.

The ITClamp is a temporary wound closure device to control severe bleeding of a penetrating injury. The ITClamp is designed to seal the edges of a wound and create a temporary pool of blood under pressure, which forms a clot until the wound can be surgically repaired (Fig. 1).

We present two cases where the ITClamp was used for haemostatic control of bleeding and one case for securing a chest tube for pleural drainage.

Case 1
A 73-year-old female was attacked in her home, and stabbed in the back of her head with a screwdriver. The injury was a 6 cm long scalp wound with ongoing arterial bleeding, and the estimated blood loss was 500 ml. The patient was pale with cold skin, and vital signs were blood pressure of 145/90 mmHg, and pulse 95. The ITClamp was immediately applied, and the bleeding stopped. The patient complained temporarily of minor discomfort during the procedure. The ITClamp produced sufficient temporary haemostatic control until it was removed in the emergency room, and the patient was definitively sutured. The patient was discharged from hospital the following day.

Case 2
The patient was a 36-year-old drug addict with severe femoral venous bleeding after repeated intra venous injections in an infected area. The patient was lying in a pool of blood in the street. The blood loss was estimated at 1000 ml with ongoing haemorrhage. He had a chronic infection in the left groin that had opened up the femoral vein. Vital signs were: blood pressure 100/50 mmHg, pulse 110 and the skin was warm and dry. The ITClamp was immediately applied, and the bleeding stopped. The patient complained temporarily of minor discomfort during the procedure. The ITClamp produced sufficient temporary haemostatic control until it was removed in the emergency room, and the patient was definitively sutured. The patient was discharged from hospital the following day.
declined. He was discharged 2 days later without complications or any further interventions.

**Case 3**
A 40-year-old male was mugged and stabbed three times in the left side of the chest. The patient was laying on the sidewalk in foul weather. The patient was in major respiratory distress, and complained of not being able to breathe. He had a respiratory rate of 40. Blood pressure was not measurable, and there was no palpable radial pulse. There were no breathing sounds on the left thorax. A chest tube was easily inserted on the left side, which established normal respiration. However, the patient was still agitated and covered in rain and blood, hence the circumstances for securing a chest tube were challenging.

An ITClamp was used to secure the chest tube (Fig. 3). As the patient was haemodynamically unstable, he was immediately transported to the trauma centre. The chest tube remained sufficiently fixated en route with blood drainage into the chest tube bag. At the trauma centre, blood transfusion was initiated. The chest tube was replaced with two larger ones, while preparing for surgery. The patient then underwent acute surgery in the operating room. The surgical pathological findings were two stab wounds in the left inferior lobe of the lung.

A total of 40 l of fluid and blood components, including 52 units of blood, were transfused. The patient went to the intensive care unit after surgery, and was extubated on day 7. He was discharged from the intensive care unit on day 8 and from the hospital on day 14 in good clinical condition.

**Discussion**
This is the first report of the clinical use of the ITClamp. We successfully used the device for haemostatic control of bleeding and for fixation of a chest tube.

In cases 1 and 2, an application of a tourniquet for extremities would not have been possible, and we found that the ITClamp provided a temporary but sufficient haemostatic control.

The ITClamp is designed to control bleeding in lesions where the wound cavity can be sealed off with minimal risk of internal bleeding. The ITClamp works by piercing metal spikes that press the skin borders together. Hence, a pool of blood remains in the wound, thus reducing further bleeding because of an increased pressure in the concealed cavity.

The clinical experience with the ITClamp is limited, as the product is new. Furthermore, no clinical studies or case studies have been reported to our knowledge. In these two haemorrhagic cases, it worked as intended.

Using the ITClamp for securing a chest tube is off label and came from necessity, treating an agitated patient under demanding circumstances. The patient was haemodynamically unstable and in need for immediate trauma care, e.g. blood transfusion and acute surgery. Securing the chest tube with an adhesive dressing was not possible, and using standard sutures would increase on-scene time that would not be beneficial for the patient. Although the metal spikes of the ITClamp penetrate the chest tube and compress it slightly, the seal created around the tube remained airtight. The chest tube drained the
pleural cavity and improved the patient’s respiratory symptoms. The procedure of securing the chest tube with the ITClamp was effortless.

**Conclusion**

We report three cases where the ITClamp was used beneficially for haemostatic control and immediate securing of a chest tube. Clinical studies of the ITClamp are needed in order to determine which patients might benefit from this device.

*Conflicts of interest*: None.

*Funding*: None.

**References**


**Address:**
Steen Barnung
Department of Anaesthesia
Centre of Head and Orthopaedics
Rigshospitalet
Section 4231 Blegdamsvej 9
Copenhagen 2100
Denmark
e-mail: barnung@gmail.com