

Alternative Methods for Endovascular and Hybrid Bleeding Control

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Puncture site or vascular access bleeding may be managed with open or endovascular methods. In this paper, we shortly describe alternative methods for endovascular and hybrid bleeding control.

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Iatrogenic access bleeding in the common femoral artery (CFA) can be managed by open surgery, endografts or hybrid (endo and open) solutions, as part of the EndoVascular resuscitation and Trauma Management (EVTM) concept. The most common method has historically been open surgical repair, but as techniques and products are developing, more solutions are becoming available. At times, the placement of an endograft in the CFA or a balloon in the external iliac using a cross over technique from the contralateral side is possible and may save both you and the patient a complicated and

lengthy procedure. Some images of interest displaying these procedures follow below in Figures 1–3.

Ethics Statement

- (1) All the authors mentioned in the manuscript have agreed to authorship, read and approved the manuscript, and given consent for submission and subsequent publication of the manuscript.
- (2) The authors declare that they have read and abided by the JEVTM statement of ethical standards including rules of informed consent and ethical committee approval as stated in the article.
- (3) Clinical photos used with permission.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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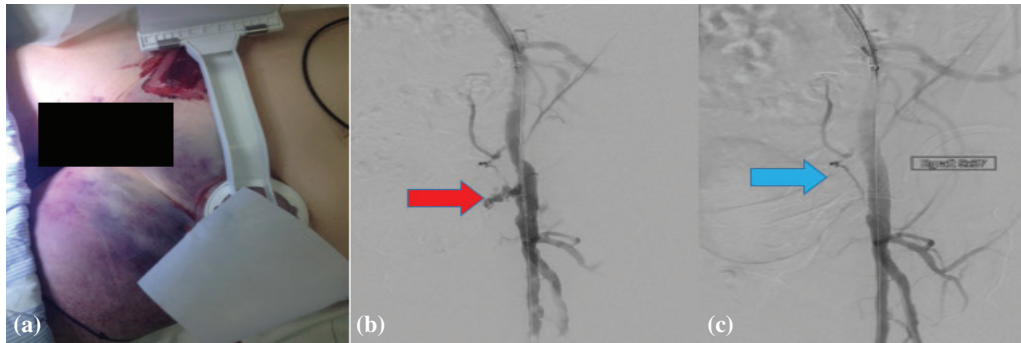


Figure 1 From left to right. The development of a large hematoma (a) following an endovascular procedure despite the FemoStop being placed (illustration only, not same patient). Angiography can be performed from the contralateral side displaying ongoing extravasation (b, red arrow). To avoid the risks of complicated surgery due to the large hematoma and postoperative infection, an endograft can be placed in the CFA (c, blue arrow), avoiding covering the deep femoral artery and arresting the extravasation.

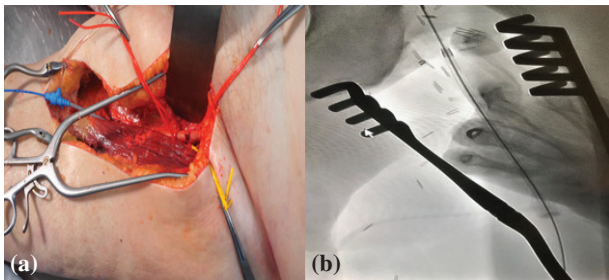


Figure 2 Another option for hemorrhage control from the CFA is by access through retrograde puncture of the superficial femoral artery (SFA) with balloon or endograft placement, displayed in a tissue model (a). It is important to not cover the deep femoral artery. Closure of the puncture site can be done by open repair or closure device (we prefer Proglide closure device). Note the manual compression on the angiography image while the sheath (b) is being placed with the balloon later being inflated for bleeding control in a clinical case.



Figure 3 Another example for bleeding control in the CFA is by using a hybrid approach (a) with balloon inflation in the CFA, seen here in the angiography image (b), controlling the bleeding while open surgical exposure and repair can be performed in a traditional manner.