

Case report: life threatening bleeding following maxillofacial injury

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Maxillofacial injury is commonly seen in the practice of emergency medicine. Major maxillofacial injury itself can be life threatening. Apart from the danger of potential airway compromise, severe haemorrhage from branches of carotid artery causing haemorrhagic shock can occur. Blind techniques, such as packing or ligation of external carotid artery are the usual methods employed to stop the bleeding. However blind techniques carry a significant failure rate. A patient with severe maxillofacial injury and torrential haemorrhage is reported. The bleeding could not be controlled by oral and nasal packing. Emergency selective carotid angiography was performed to identify the source of bleeding and embolization of the bleeding branches successfully arrested the haemorrhage. Interventional radiology could be as effective, if not superior, as an operation in controlling bleeding in selective cases. (*Hong Kong j.emerg.med.* 2002;9:42-45)

Keywords: angiography, carotid artery, embolization, haemorrhage, interventional radiology, maxillofacial injury

Case

Our patient was a 16-year-old Chinese male who sustained multiple injuries after being knocked down by a lorry in a traffic accident. He had severe head injury with GCS of 3/15. The pupils were fixed and dilated. He had fractures of multiple ribs, left clavicle and left distal radius. There was left pneumothorax. He had major maxillofacial injury with profused bleeding from oral and nasal orifices as well as from multiple facial wounds. The mandible bone was shattered.

The initial systolic blood pressure was about 90 mmHg. He was actively resuscitated by a trauma team approach. He was intubated and put on

mechanical ventilation. Left pneumothorax was drained. Vigorous fluid therapy was started. Nasal and oral packing were placed. Bleeding wounds were sutured up. Bedside focused abdominal ultrasound study revealed no intraperitoneal free fluid. CT scan brain revealed bilateral subdural haematoma, subarachnoid haemorrhage and marked cerebral oedema.

Profused bleeding from left forehead and facial wounds as well as oral and nasal orifices continued. The packing procedure was not effective to control the bleeding. The systolic blood pressure dropped to 60 mmHg despite vigorous fluid resuscitation (3000 ml normal saline, 1500 ml Gelofusin, 1500 ml blood in the first 2.5 hours).

Emergency left carotid angiography was performed at 2.5 hours time after the arrival of the patient to hospital. It revealed active bleeding from the anterior superficial temporal artery at the frontal region (Figure 1) and from the internal maxillary artery. (Figure 2) Embolization of the external carotid artery was done with gel-foam pledgets. The whole procedure was finished within 40 minutes. The bleeding was successfully controlled after the embolization. (Figure 3)

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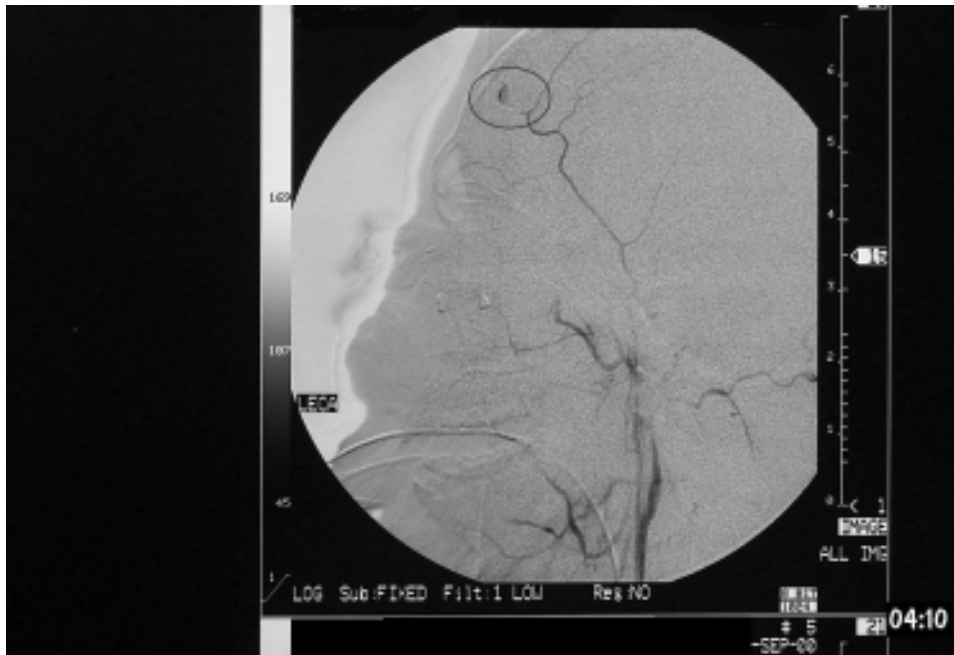


Figure 1. Active bleeding (indicated by the circle) from the anterior superficial temporal artery at the frontal.



Figure 2. Active bleeding (indicated by the circle) from the internal maxillary artery.

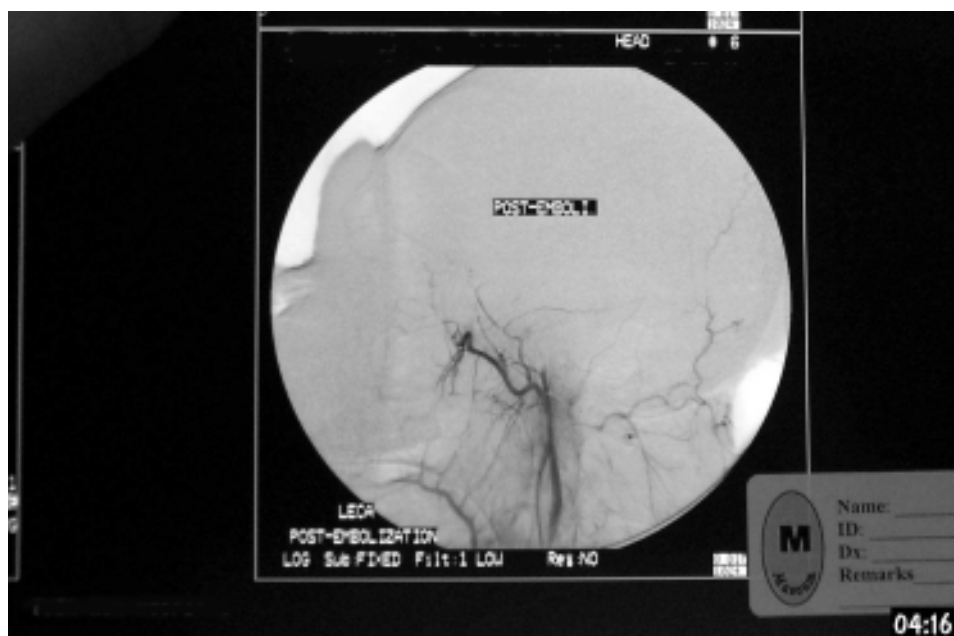


Figure 3. Embolization of the external carotid artery was done with gel-foam pledgets. The bleeding was successfully controlled after the embolization.

The patient was then sent to theatre for definitive operation to repair the mandibular fracture. The patient finally died on the 6th day after the admission because of the severe brain injury and multiple organ failure. The significant post mortem findings included haemorrhagic lungs, subdural haematoma and haemorrhage in the third ventricle of the brain.

Discussion

Life threatening haemorrhage can occur in major maxillofacial injury as contrary to many people's idea. Haemorrhagic shock was demonstrated to occur in 24% of severe blunt maxillofacial injury patients in one study.¹ Stop the bleeding is the mainstay treatment instead of intravenous fluid replacement or transfusion. Blind techniques, such as oral and/or nasal packing are indirect methods. They do not address the importance to treat the origin of bleeding. Besides packing procedure causes much discomfort and may cause local problems like nasal septum excoriation, necrosis or infection as well as systemic problems such as hypoxia and hypercemia.

Ligation of external carotid artery also carries the same disadvantage of not treating the origin of bleeding. The method fails because of collateral circulation from both sides of the carotid complex and the backflow via the Circle of Willis.² Selective carotid angiography is useful in locating the exact site of bleeding. Embolization is the invaluable tool employed to stop the bleeding after the source being identified.

Transcatheter embolization has been widely in use in treatment of massive bleeding from pelvic fracture and retroperitoneal bleeding as a result of various causes. It has been regarded as treatment of choice under some situations.³ In maxillofacial surgical field, embolization of external carotid artery and branches has been employed for treatment of hypervascular tumours like nasopharyngeal angiofibroma, carotid glomus tumour,⁴ angioma of face or scalp, to occlude post-traumatic arteriovenous fistulae,⁵ as well as to stop severe epistaxis.⁶

The application of emergency selective angiography and embolization of external carotid artery and/or branches to stop life threatening haemorrhage in

maxillofacial trauma patients should deserve more attention. The procedure is safe and no complication has been reported in one study.¹

The application of embolization in injured internal carotid artery is hindered by the risk of inducing brain infarction. However, the possibility of temporary occlusion of a bleeding internal carotid artery by double balloon catheter without inducing brain infarction is not determined. In our case, it is an effective and 'quick' procedure (the whole process was finished within 40 minutes).

The immediate availability of an experienced interventional radiologist, related manpower and facilities are the crucial determinants of success. The idea of having an interventional radiologist participating in a trauma team as second tier specialist should be considered. Bleeding control instead of mere replacement is an important concept that cannot be over-emphasized in trauma care. Interventional

radiologist can be as effective, if not superior, as a surgeon to stop the bleeding in selective conditions.

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