

# Case report: coronaric graft-stent deployment in the treatment of carotid blowout.

## Introduction

The “carotid blowout syndrome” (CBS), which refers to the heamorrhage caused by the rupture of the carotid artery and 1-4 (ajnr) its branches, may be a severe complication of rhinopharyngeal carcinoma. It is strongly associated with local invasion, radiation-induced necrosis and recurrent tumors 2(ajnr) for head-and-neck cancers.

The reported neurologic morbidity and mortality rates associated with this syndrome are, respectively, 40% and 60%. 3 Surgical management of CBS has proven to be technically difficult because exploration and repair of the previously irradiated field are challenging. Endovascular procedures, as embolization or stent deployment, are reported as a good alternative to surgery.1-5

Stent graft placement for CBS treatment seems the best choice in order to achieve haemostasis and to prevent neurologic morbidity (articolo di Chang). We report a case of an internal carotid blowout, determined by a rhinopharyngeal cancer, successfully treated with a covered balloon expandable graft-stent.

## Case Report

A 38-year-old smoker woman with recent diagnosis of spinocellular rhinopharyngeal carcinoma, on chemotherapy, was admitted to our hospital for massive pharyngeal haemorrhage, loss of consciousness with loss of sphincter control.

The recent anamnesis included several imaging studies, which highlight a 4 X 3 cm lesion with necrotic core, infiltrating and narrowing the left internal carotid artery and jugular vein, extending from the left tonsillary lodge to the parapharyngeal region, with invasion evidence of the parotid gland, medial left pterygoid muscle, pterygopalatin fossa, middle ear, and mastoid cells, with bone erosion. Further imaging examinations and biopsies of the rhinopharynx determined the stadium of the lesion as T4N2M0 EBV/EBER negative. Conservative therapy including routine medication, blood transfusion and local compression showed almost no effect.

The patient was then referred to the angiographic suite of the Interventional Radiology Department in order to undergo an emergency angiography. A tetraval cerebral angiography, obtained through a 5 Fr retrograde right transfemoral access, showed severe narrowing of the left ICA, probably due to vasospasm, and patterns suggesting bleeding in the left ECA. Moreover the angiography showed a reduced representation of left intracranial vessels without visualization of left ACA. It was, thus, decided to perform an embolization of the bleeding small distal ECA branches. A 4 Fr 120 cm long Vertebral (Terumo - ) was, then, advanced over an 180 cm long angled standard guidewire (terumo, japan) into the left ECA and , afterwards, a superselective catheterization of the small bleeding branches was performed with a Progreat catheter (terumo – specifiche da inserire) and superselective embolization of different vessels showing active bleeding, with 150, 250 and 350 mn PVC particles (Contour – Boston scientific), was carried out. After a few

minutes another angiography of the common carotid artery was performed, showing resolution of the ICA vasospasm, presence of bleeding due to a laceration of the distal third of the extracranial portion of the ICA, and an irregular shaped reduction of the proximal third of the carotid lumen, imputable to intraluminal thrombosis. In order to control the haemorrhage and to restore a physiologic vessel patency with regular blood flow through the ICA, it was decided to deploy a covered stent-graft.

The following procedural steps required an introducer exchange with a 45 cm long 9 Fr introducer sheath (Radifocus – Terumo – Tokyo, Japan). After the removal of the former guidewire, a 300 cm long 0,014 in guidewire (Choice - Boston Scientific - ) was advanced into the ICA till the intrapetrous segment of the ICA over the 4 Fr Vertebral catheter. Subsequently the Vertebral catheter was withdrawn and a 6 x 20 mm Fluency graft-stent was advanced over the guidewire; however the guidewire resulted unfit in order to provide a sufficient support for advancing the Fluency stent into the distal third of the extracranial internal carotid artery. A 260 cm long 0,035 in angled stiff guidewire (Terumo – asdas), instead, provided enough support but the traumatism of the stent with the vessel wall, due to its profile and low flexibility, was considered dangerous and, in order to avoid an extension of the vessel laceration, it was decided to opt for a different stent. A 6 x 15 mm Direct-stent (InSitu technologies), characterized by higher flexibility, a lower profile and reduced vessel traumatism, was chosen and a 8 Fr 80 cm long 40 DEG was positioned as guide catheter.

After the fluoroscopic guided placement of the Direct-stent over the lacerated portion of the ICA, the device was deployed inflating the balloon with a manometric syringe (Encore – Boston Scientific, xx) at 6 atm pressure. A check angiography demonstrated the recovery of the physiologic vessel patency and blood flow and exclusion of the lacerated segment of the ICA. A subsequent cerebral angiography showed an improvement in the perfusion of the MCA and its distal branches, with an unmodified angiographic pattern regarding the ACA and its distal branches.

As a clinical result interruption of the rynopharyngeal bleeding and normalization of heart frequency and blood pressure was obtained, with resuscitation and stabilization of the patient's condition.

A 2 week duplex ultrasound follow-up showed the persistent patency of the ICA.

## **Discussion**

Carotid blowout syndrome (CBS) is one type of arterial injury which can occur following head and neck tumors, radiation treatment, chemotherapy and surgery. Radiation therapy, in particular, is characterized by a higher risk of CBS. Patients with CBS have a 60% risk of neurological morbidity and 40% of mortality. These risks are considerably higher in patients, like the one presented in this case report, presenting massive bleeding and carotid thrombosis. (4 e 5 di KIM, 4 di chen).

Treatment of CBS comprehends open surgery with resection and reconstruction or carotid artery ligation, and endovascular procedures; the latter ones include embolization with steel and/or platinum coils, gelatin sponge particles, polyvinil alcohol based foams, detachable balloons and, more recently, stent-graft placement (13 di Chen). Surgical procedures are characterized by an unsatisfying average 60% rate of major complications such as death and stroke (3 di chang, bao Luo – articolo-), and have been more and more replaced by endovascular embolization techniques. These ones have shown many advantages over surgical techniques, such as more distal access to the bleeding points, reduced operative time, no need for general anesthesia and a more precise demonstration and localization of bleeding points.

Embolization of a ICA founds its rationale in the progressive and slow narrowing of the arterial lumen induced by the pharyngeal tumor and the radio/chemotherapy, which stimulates the hemodynamic compensation by the hypertrophy of the contralateral carotid and vertebrobasilar system, thus limiting the eventual brain damage caused by complete ICA occlusion. However, even if characterized by a lower morbidity and mortality rate rather than surgical procedures, embolization of the ICA still presents an unsatisfying 15-20% rate of developing immediate or delayed cerebral ischemia.

Several recent studies report endovascular treatment with a stent-graft for CBS as a quick and effective method, determining lower morbidity compared to surgical procedures or permanent arterial occlusion by endovascular techniques. Moreover, it is a less time-consuming procedure, which should be preferred in life-threatening situations such as profuse and active bleeding, responsible for unstable vital signs.<sup>6-14</sup> (pyun)

Though several case reports describe a relatively high rate of recurrent active bleeding (<sup>1,14,15</sup> pyun), the immediate clinical results in patients who underwent placement of a covered stent for CBS have been considered favorable in many reports (<sup>6-14</sup> pyun).

Covered stents already in clinical use for the endovascular treatment of CBS are covered carotid stents as Wallgraft (Boston Scientific) and unconventionally used oesophageal covered stents as NITI-S (Taewoong Medical Co.). In the first instance we chose to deploy the Fluency plus vascular stent-graft (Bard – xxx) because of its high radial expansion force and its 2 mm flared bare ends, in order to minimize the risk of dislocation and subsequent endoleak. We subsequently decided not to deploy the Fluency plus stent because of its reduced vessel compliance and its important vessel attritus, determined by the high profile of the stent, which made the stent placement difficult and the thromboembolic risk too high.

In need of a lower profile stent-graft, also because of the non existence of stent-grafts designed for the endovascular treatment of CBS, we opted for an unconventional use of the coronaric “Direct Stent” stent graft (In-situ technologies, xxx). Direct-Stent is one of the thinnest stent-grafts currently in commerce, designed for the treatment of ruptures, dissections and aneurysms of the coronaric arteries, characterized by a good flexibility and accessibility to tortuous anatomies. These characteristics allowed us to successfully cross the lesion, with a reduced vessel thrombosis and avoiding further secondary thromboembolic occlusions, and correctly deploy the stent. As a result, a satisfying hemostasis was obtained, and the vessel patency was nearly completely restored.

## Conclusion

In summary, the unconventional use of the balloon expandable “Direct Stent” may represent a safe and useful tool for the endovascular treatment of the CBS. Although long term follow up is needed in order to value the eventuality of bleeding recurrence, the immediate clinical results have been very satisfying. This case report highlights the usefulness and versatility of endovascular stent-graft placement of this covered stent for rescue treatment of life threatening carotid blowout syndrome.