EXPERIENCE OF COVERED CORONARY STENT GRAFTS AS
TREATMENT OPTION FOR CAROTID CAVERNOUS FISTULAS WITH
FOLLOW-UP RESULTS

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INTRODUCTION

Endovascular detachable balloon occlusion and coil occlusion have been well-established options for the treatment of carotid cavernous fistulas (CCFs). In recent years, sporadic treatment of CCFs endovascular covered stent grafting is proving an excellent result not only in successful treatment of fistula but also preserving patency of parent artery. However, only a few such cases have been reported in the literature while covered coronary stent grafts have been occasionally used in the intracranial vasculature. In this study, we present our experience of CCFs, treated by the placement of covered stents, and provide their clinical and angiographic follow-up results.

MATERIALS AND METHODS

Four consecutive patients with CCFs underwent the Jostent coronary stent graft (Abbott Vascular, Redwood City, CA) placement alone at our department during 2 years. Two were direct CCFs with a symptom triad and 2 were indirect CCFs with diplopia. These patients had periodic clinical follow-up examinations (at 6–29 months) with all receiving angiographic follow-up examination (at 5–15 months).

RESULTS

Covered stent placement was technically successful in all 4 patients. Immediate post-procedural complete exclusion of the fistula was achieved in 3 and near complete exclusion with small endoleak was observed in 1 after stent placement. ICA patency was preserved in all. Symptoms related to CCFs regressed within 1–14 days in all patients after treatment without thromboembolic events. There was no mortality and no immediate post-procedural morbidity related to the procedure. Follow-up cerebral angiography showed complete exclusion of 3 included the one with previous small endoleak. However, in one who had complete exclusion immediately, recur the filling during follow-up. This patient treated with re-dilation of the stent using balloon. Final follow-up angiography showed complete exclusion of all CCFs and revealed good stent patency of the ICA without intra-stent stenosis.

complete obliteration by the placement of Graft–Stent (Jostent graftmaster)

Table I. Data of patients with CCF treated with covered stents with follow-up results

Patient sex / age (years)	Sings/symptoms	Stent sizes	Post-procedural angiographic results	Final angiographic FU
F/73	Proptosis, Visual disturbance	Graftmaster 3.5 X 16 mm	Radioanatomic cure without complications	Stable CCF occlusion with ICA patency
*M/28	Conjunctival injection, Mild proptosis	Graftmaster 4.5 X 16 mm	Small endoleak was observed	Stable CCF occlusion with ICA patency
*M/65	Proptosis, Visual loss	Graftmaster 4mm X 12 mm	Radioanatomic cure without complications	Stable CCF occlusion with ICA patency

* Complete obliteration at immediately angiography, but Small endoleak was observed follow up angiography at 3 months after
* Graft stent insertion was performed after stent assisted coil embolization

Successful obliteration of left CCF post coil embolization state.

DISCUSSION

Treatment of CCF can be extremely difficult. Even in the best of hands both detachable balloons and coils can result in parent artery occlusion. With the insertion of coils directly into the cavernous sinus, there is a potential risk of coil dislodgment into the ICA, especially if the defect is large. In addition, detachable coils can turn out to be an extremely expensive option. Detachable balloons on the other hand are unreliable and are known to deflate prematurely resulting in recurrence and at times even in diversion of blood into intracranial veins which can result in bleeding.

Recently, graft stents have been used for the treatment of aneurysms, arterial dissections, and arteriovenous fistulas as well.

The Jostent GraftMaster Coronary Stent Graft used in this series is composed of a sandwich construction of 2 bare stainless steel stents with a thin layer of polytetrafluoroethylene (PTFE) in between.

The stent is rigid and cannot be navigated within tortuous anatomy. Possible complications that may result from this rigidity are dissection and periprocedural spasm of the cerebral arteries.

Our results combined with previously reported results proved that this treatment strategy is feasible, efficient, and should be considered as an alternative treatment for those fistulas in which the use of detachable balloons or coils fails to occlude the fistula and preserve the ICA patency

CONCLUSSION

Graft-stents should be considered as an alternative option of treating CCFs and preserving the parent artery by arterial wall reconstruction especially in patients with a fistula that cannot be successfully occluded with detachable balloons or coils. Although a larger sample and expanded follow-up are needed, our series shows that covered stents can be used in the treatment of CCFs with symptomatic relief as experience with this device increases, materials continue to improve, and more data are accumulated.