



**Centre universitaire de santé McGill
McGill University Health Centre**

**Technology Assessment Unit of
the McGill University Health Centre**

**Use of Matrix Coils in the
Treatment of Cerebro-vascular
Aneurysms: An Update**

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Invitation.

This document was developed to assist decision-making in the McGill University Health Centre. All are welcome to make use of it. However, to help us estimate its impact, it would be deeply appreciated if potential users could inform us whether it has influenced policy decisions in any way.

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BACKGROUND

In June 2004 at the request of Mr Victor Simon, Chief Operating Officer of the MUHC, the TAU carried out an evaluation of the use of Matrix Coils in the treatment of cerebro-vascular aneurysms. It was concluded that evidence of additional health benefits had not been identified, and it was recommended that despite the relatively low budget impact, the purchase of matrix coils for routine management of cerebral aneurysms could not be recommended¹. The objective of the present report is to identify and evaluate any new evidence on this topic that might have become available since the original publication, and to reconsider whether its recommendations should be modified.

INTRODUCTION

Until recently the standard treatment of cerebral aneurysms was surgical application of a clip around the neck of the aneurysm. In 1991, Guglielmi described an endovascular approach by which platinum coils, since called Guglielmi Detachable Coils (GDC), were introduced into the aneurysm through a catheter passed via the femoral artery^{1,2}, with the object of inducing thrombotic occlusion and fibrosis of the aneurysm sac. Subsequently, coils were marketed that are coated with various bioactive materials with the objective of increasing inflammatory reaction and causing more rapid and firmer occlusion of the aneurysm. One of these, the Matrix coil, coated with polyglycolic acid/lactide is the subject of this follow-up report.

METHOD

A literature search was carried out using the Medline, PubMed, Cochrane and International Network of Agencies for Health Technology Assessment (INAHTA) database. The search terms used were: Matrix detachable coils, MDC, Guglielmi, Guglielmi detachable coil, GDC, cerebral aneurysm, brain aneurysm, cerebro-vascular aneurysm, neuro angiography, endovascular, used in different combinations. The search was limited to publications appearing between July 2004 and March 2009, and to publications in the English or French languages.

RESULTS

Since publication of the previous report there have been no randomized clinical trials that compare matrix coils with GDC (i.e. coils without a bioactive coating), or any systematic review or health technology assessment on this subject. However, there have been nine further cohort studies describing the use of matrix coils, and three non-randomized comparative cohort studies comparing matrix coils with GDC. These were reviewed, looking for any evidence of clinical superiority of matrix coils, and specifically for higher occlusion rates or lower reperfusion (recanalization) rates

The three non-randomized comparative cohort studies are summarized in [Table 1](#). While the rates of total occlusion vary greatly between studies (46%-99%), probably due to differences in definition, the occlusion rates for each intervention within each study were very comparable, as were the recanalization rates in the two studies in which they were reported^{4,5}. In only one

study did the authors report slightly higher occlusion rates and better clinical outcomes with Matrix than with GDC³, but they commented that this result was possibly due to the increasing experience of the single surgeon who carried out all procedures, in which the GDC series was completed first.

The nine cohort studies are summarized in [Table 2](#). Study outcomes vary considerably, probably again due to differences in definition. The authors of eight of these studies conclude that they found no evidence of superiority of matrix compared to GDC^{6,7,8,9,10,11,12,13} while one¹⁴ concluded that matrix coils had a worse recanalization rate than those reported with GDC.

DISCUSSION

Although it can clearly not be concluded on the basis of these studies that matrix coils are not superior to GDC, it is equally apparent that there is no new evidence suggesting that they are. The issue will have to await the outcome of two RCT's^{15,16} the first of which is expected to be completed in March 2011.

CONCLUSION

- **A review of the literature published since our previous report contains no evidence that suggests the use of Matrix coils will have superior clinical outcomes to GDC.**
- **There is therefore no reason to change the previous recommendation that the purchase of matrix coils for routine management of cerebral aneurysms is not recommended.**

**TABLE 1. Non-randomized comparative cohort studies of matrix coils vs. GDC:
Occlusion and recanalization rates**

First Author, Year	Study Design	Coil	Number of Patients	Number of Aneurysms	Occlusion rate	Re- canalization rates	Follow-up months	Authors' Conclusions
Katsaridis ³, 2006	Single centre. Retrospective. Single surgeon.	Matrix	120	145	99%			Slightly, though not significantly, better occlusion rate and clinical outcome with Matrix. Possibly due to more experience
		GDC	187	219	96%			
Rivet ⁴, 2007	Single centre. Retrospective.	Matrix	70	82	46%	41%	>6m	There is insufficient evidence to support the use of matrix coils over bare platinum coils
		GDC	70	80	53%	32%	>6m	
Kang ⁵, 2005	Single centre. Retrospective.	Matrix	51	56	96%	36%	12	Recanalization rates were not different with matrix vs GDC historical controls
		GDC	78	87	97%	45%	12	

TABLE 2. Cohort studies of matrix coils: Rates of occlusion and recanalization

First Author, Year	Study Design	Number of Patients	Number of Aneurysms	Occlusion rate	Recanalization Rate	Follow-up (Months)	Authors' Conclusions
Pierot ⁶, 2006	Multicentre Prospective	236	244	44%			Initial morbidity and mortality rates for matrix are within reported ranges for GDC.
Murayama ⁷, 2006	Single centre Prospective	97	102	26%	Of 87 cases 17%	8(2-22)	Matrix gives similar clinical outcomes to GDC. Anatomical outcomes moderately better.
Rossitti ⁸, 2007	Single centre Prospective	104	118	38%	Of 73 cases 15%	6.5(1-17)	This study confirms that aneurysm coiling with matrix is feasible, effective and safe.
Deng ⁹, 2007	Single centre Retrospective	102	102	62%			Primarily a safety study. Conclusion, matrix as safe as bare platinum coils.
Mitra ¹⁰, 2007	Single centre	77	84	56%	Of 70 aneurysms 24%	10(6-28)	Matrix coils are safe. Recanalization rates are comparable to historical rates with GDC
Linfante ¹¹, 2009	Single centre Prospective	52	54	94.4%	Of 21 cases 14%	6	Primarily a safety study. Conclusion, Matrix coils had a satisfactory safety profile
Wong ¹², 2007	Single centre Retrospective	42	44	64%	16% recurrences	6	Matrix coil embolization safe, but no reduction in recurrence rates compared with GDC
Taschner ¹³, 2005	Single centre	25	25	68%	24%	6(1-7)	A prospective, randomized study is necessary to assess the potential benefits of matrix coils
Niimi ¹⁴, 2006	Single centre	70	74	18 %	41%	12.2(0-34)	Matrix coils have a worse recanalization rate than reported rates for GDC

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