ORIGINAL ARTICLE

Complications in Intracranial Aneurysms without Assisted Technique Coiling

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ABSTRACT

Objective: *To report an experience of complications occurring during endovascular coiling (without assisted technique) in intracranial aneurysms.*

Materials and Methods: *This study was conducted from January 2010 to December 2013at the department of Neuroradiology, PGMI Lahore General Hospital, Lahore. A total of 300 patients were included in this study of both gender (male and female) and in the age range of 25 – 65 years. In our study all the patients with ruptured and un-ruptured aneurysms had undergone coiling.*

Results: *Out of 300 patients, there were 123 (41%) males and 167 (59%) females' patients. Their age ranged from 30 – 65 years. In this study the overall mean age is 48.36 years. The maximum numbers of patients were in their fifth and sixth decades of life. Coiling was successfully performed in all patients with very low complication rate (1%).*

Complications: *There were only 3 complication which were recurrence / recondition 1 (0.3%) case detachment of coil 1 (0.3%) case of small rebleed from aneurysm (0.3%) 1 case each.*

Conclusion: *Coiling is a safe and less invasive procedure for bothruptured and un-ruptured intracranial aneurysms with very less complications and low morbidity and mortality rate as compared to other invasive procedures.*

Keywords: *Coiling, Intracranial aneurysms.*

Abbreviations: *GDCs: Guglielmi Detachable Coils.*

INTRODUCTION

An intracranial aneurysm is a disorder in which there is a weakness in the wall of the cerebral artery or vein causing a localized dilatation or ballooning of the vessel.[1] According to autopsies and angiographic studies, intracranial aneurysms account for 0.5% to 6% in adults.[1] Intracranial aneurysm can be classified according to its size into small aneurysms (> 15 mm), large aneurysms (15 – 25 mm) and giant aneurysms (25 – 50 mm).[2]

Aneurysms can also be classified into saccular, fusiform, mycotic and micro aneurysms according to its shape.

Saccular aneurysm accounts for 90% of all intracranial aneurysms and 85% arise from arteries of circle of Willis.[3,4] The most frequent location of aneurysms are in anterior circulation especially anterior communicating artery (35%), followed by internal carotid artery (30%) including internal carotid, posterior communicating and ophthalmic artery and middle cerebral artery (22%).[5] Multiple aneurysms are found in about 30% of patients.[6]

The patho-physiology of intracranial aneurysms remains a controversial topic. A multifactorial etiology reflecting the interaction of environmental factors, such as obesity, alcohol consumption, atherosclerosis and hypertension, and a congenital predisposition associated with various vascular abnormalities such as: Autosomal dominant polycystic kidney disease, Marfan syndrome, MEN type I, Hereditary hemorrhagic telangiectasia, Neurofibromatosis type I etc.[7-9]

Characteristics sign and symptoms of ruptured and

un-ruptured intracranial aneurysms include sudden severe headache, vomiting, loss of consciousness, neck stiffness, seizures, third nerve palsy and bitemporal hemianopia etc.[10,11] Frequency of symptomatic intracranial aneurysms is only 10 – 15% with the majority being identified incidentally.[12,13] Aneurysms can be diagnosed by taking proper history, clinical examination and with the help of radiological imaging's including CT – scan, CTA, MRA and by doing Digital Subtraction Angiography.

Now a day, treatment modalities for intracranial aneurysm include surgical clipping and endovascular coiling. As clinical experience with coiling has increased along with improvement in coil design and imaging modalities, endovascular coiling has been used with increasing frequency even in patients who could be treated by conventional surgical clipping.[14,15] Furthermore, some international centers are treating patients with surgical clipping only if they cannot be treated primarily by endovascular coiling.[16]

The main reason to adopt endovascular coiling as a treatment of choice in aneurysmal surgery is because of its less invasiveness, short hospital stay, early recovery, low morbidity and mortality and less complication rate as compared to surgical clipping.

MATERIALS AND METHODS

This study was conducted from January 2010 to December 2013 at the department of Neuroradiology, PGMI Lahore General Hospital, Lahore. A total of 300 patients were included in this study of both gender (male and female) and in the age range of 25 – 65 years. In our study all the patients with ruptured and un-ruptured aneurysms had undergone coiling under guidance of 3D angiography machine. All the patients were strictly followed both clinically and radio logically for the period of 01 years.

RESULTS

Sex Incidence

Out of 300 patients, there were 123 (41%) males and 167 (59%) females' patients in our study (Table 1).

Age Incidence

Their age ranged from 30 – 65 years. In our study the overall mean age is 48.36 years. The maximum numbers of patients were in their fifth and sixth decades of life.

Table 1: *Sex Incidence.*

Sex	Number	Percentage
Male	123	41%
Female	167	59%
Total	300	100%

Procedure Outcome

Coiling was successfully performed in all patients with excellent results and very low complication rate (1%). These patients were regularly followed for 02 years and there wasn't any post coiling morbidity and mortality noted in these patients.

In our study, a total of 300 patients of both gender with intracranial aneurysms were admitted and successfully treated with endovascular coiling (without assisted technique). All the patients were strictly monitored both clinically and radio logically during and after the procedure for any complications associated with the procedure.

All the patients were doing well except 03 (1%) patients who developed minor complications which were managed successfully.

Complications

There were only 3 complication which were recurrence / recondition 1 (0.3%) case detachment of coil 1 (0.3%) case of small rebleed from aneurysm (0.3%) 1 case each.

Table 2: *Complications.*

Complications	Number	Percentage	Outcome
Aneurysm bleed	1	0.3%	Recovery good
Detailed coil	1	0.3%	
Recurrence	1	0.3%	
Total	3	1%	

Out of these 03 patients, one patient (0.3%) after insertion of coil into an aneurysm bleeds spontaneously as shown in fig 1a and 1b. Patient was immediately shifted to ICU and strictly monitored. Patient was discharged after few days with no apparent morbidity.

Fig. 1a: *Post Coiling Bleed on Angiography.*

Fig. 1b: *Post Coiling Bleed on CT - Scan.*

In another patient (0.3%), coil got detached during procedure from an aneurysmal sac into nearby vessel but fortunately patient didn't develop any deficit. (Figure 2a).

There is recurrence/recanalization of aneurysm noted in one patient (0.3%) after one year follow up by angiography (Figure 3a and 3b).

Fig. 2a: *Post Coiling Coil Detachment.*

Fig. 3a: *Recurrence and Recoiling of Aneurysm.*

DISCUSSION

Fedor Serbinenko, a Russian neurosurgeon in 1970 was the first to describe endovascular treatment of intracranial aneurysms. A vascular catheter with detachable balloon was used to treat aneurysms either by depositing balloon into the aneurysm lumen directly or by occluding the artery from where the aneurysm arose. Later in 1991, Guido Guglielmi introduced endovascular approach with electrolytic detachable platinum coils to occlude aneurysms. These coils are called Guglielmi detachable coils (GDCs). With clinical experience in endovascular coiling and improvement in coil designs and detachable system, coil embolization is considered as standard procedure in intracranial aneurysms.[1-3]

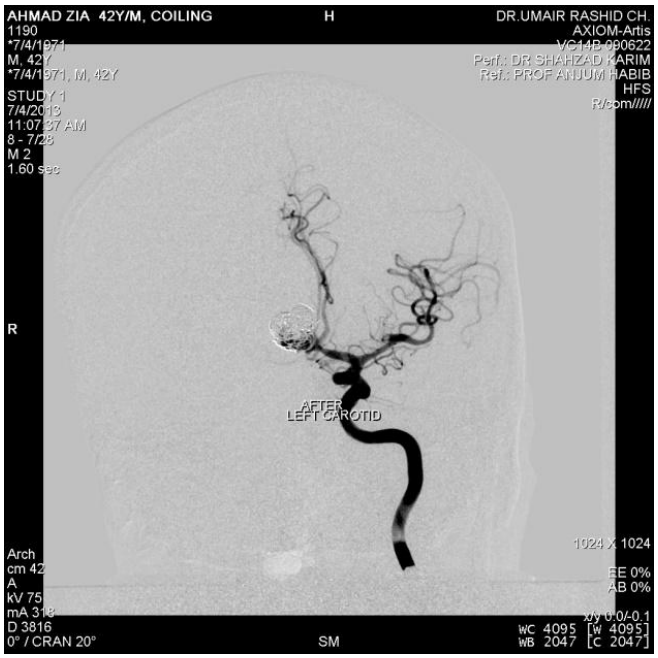

Fig. 3b: *Recurrence and Recoiling of Aneurysm.*

Complication rate in endovascular coiling of intracranial aneurysms is very low as compared to other invasive procedure.

In 2006, ***W.J. van Rooij, et al*** conducted a study on 681 patients to report procedural complications of coiling of intracranial aneurysms and showed 2.6% procedural mortality and 3.2% procedural morbidity in these patients. Complications include procedural rupture of aneurysms in 08 patients and thromboembolic complication in 32 patients.[14]

Hong-Ki Kim, et al in 2009 also conducted study on 173 patients and advocated 4.6% thromboembolic complications during and after a procedure.[16]

In another study conducted in 1999, ***Murayama Y, et al*** reported immediate procedural complications of 4.3% in the first 50 patients treated in the series of 115 patients. No clinical complications were observed in the last 65 patients.[16]

S. Claiborne Johnston, et al in 2001 conducted study on 2069 patients with intracranial aneurysms and advocated decrease mortality, hospital stay and charges in patients treated by endovascular coiling as compared to surgical clipping.[15]

Thus in our study rate of complications were less as compared to International studies.[14-16]

CONCLUSION

Coiling is a safe and less invasive procedure for both ruptured and un-ruptured intracranial aneurysms with very less complications and low morbidity and mortality rate as compared to other invasive procedures.

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