

Endovascular Management of Aneurysms and its Effect on the Eyes (Visual deficit)

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Abstract: **Introduction:** Paraclinoid aneurysms are cerebral aneurysms that develop in the inner carotid artery (ICA) that connect the cavernous sinus outflow (proximal dural ring) with the posterior interconnecting artery (PCoA). **Objective:** This paper aimed to study endovascular management of aneurysms and its effect on the eyes (visual deficit). **Patients and Methods:** This paper showed a cross-sectional study followed to the outcome. This paper was studying endovascular management of aneurysms and its effect on the eyes (visual deficit) throughout 24th 2021 February to 25th June 2022 in different hospitals in Iraq were focused into the study of aneurysms patients into 35 ages even 65 years. This paper compared between ruptured patients and unruptured patients were included 55 cases into each of the two groups for ages during 35 to 65 years old, by using the SPSS program. **Results and discussion:** In the Examination of aneurysm patients, this paper was determined Ruptured (69.1%) and Unruptured (30.9%). This paper was progressed into Changes of outcomes patients into aneurysm patients based on sizes were found Regular (50.9%) was higher in compared with large (29.1%) and Giant (20%). To further of outcomes, this paper focused on Finding results of aneurysm features which appear to calcification of patients during preoperative in compare with thrombosis. To compare between the ruptured group and unruptured group, these results showed Changes of clip type into ruptured patients with 21 cases were. Found almost patients got vision curved, with 8 cases which Changes of clip type into unruptured patients which they gotten 11 cases of straight vision with only four patients. **Conclusion:** In conclusion, this paper found the unruptured patients got less impact of an aneurysm in compare with ruptured patients, which effect on patients' vision during pre-operative. This study was progressed that almost all of the ruptured patients' group had a lot of cases in Changes of clip type with a comparison with the unruptured patients' group.

Keywords: Ruptured and unruptured patients, Aneurysms, Clip type, and visual deficit.

INTRODUCTION

Para-clinoid aneurysms are cerebral aneurysms that develop in the inner carotid artery (ICA) that connect the cavernous sinus outflow (proximal dural ring) with the posterior interconnecting artery (PCoA). [Burrows, A.M. *et al.*, 2016]

Technically speaking, direct operation for para-clinoid aneurysms is still difficult since they are located close to several important structures, including the optic apparatus, cavernous sinus, including oculomotor nerve. These include the C5 and C6 segments of the ICA, their branches, and perforating arteries. [Colli, B.O. *et al.*, 2013; D'Urso, P.I. *et al.*, 2012]

In addition to the intricate anatomical arrangement present, these structures are hidden by dura and bone, which must be removed or drilled in order to view them. The prolonged exposure, as well as secure clipping of para-clinoid aneurysms, require anterior clitoridectomy, optic strut removal [D'Urso, P.I. *et al.*, 2011; Durst, C.R. *et al.*, 2014], even distal dural ring dissection, and technical mistakes in their performance can result in visual loss, catastrophic haemorrhage, and strokes. [Fulkerson, D.H. *et al.*, 2009]

Study with experienced neurosurgeons, cadaveric dissection, studying surgical footage, and first-hand experience all contribute to a thorough grasp of this area [Horiuchi, T. *et al.*, 2016]. It takes a learning curve to go over, but once you do, the majority of para-clinoid aneurysms may be surgically removed with great success. [Iihara, K. *et al.*, 2003]

The case volume is necessary to develop microsurgical competency in para-clinoid aneurysms has been reduced [Kanagalingam, S. *et al.*, 2012]; however, because of developments in endovascular technology, including the advent of flow diverters and an increase in their clinical application. Inexperienced neurosurgeons might never learn the requisite abilities, while seasoned ones might never need them. [Kikuta, K.I. *et al.*, 2016]

As a result, compared to other aneurysms, para-clinoid aneurysms and how they are managed are more contentious [Lai, L.T. *et al.*, 2013]. When compared to microsurgical therapy, endovascular surgery for para-clinoid aneurysms is linked with a lower incidence of total occlusion as well as more frequent recurrence [Matano, F. *et al.*,

2016]. Additionally, endovascular therapy might not be able to relieve the symptoms of optic nerve compression the way that surgical debulking or aneurysm deflation can. [Nanda, A. et al., 2011]

Patients are drawn using this minimally invasive method because to the outstanding outcomes with flow diverters in this area; however, problems are seen in 1.4% to 7.6% of cases, and fatality rates can reach 4% to 8%.7 Additionally, these devices can only be used in instances of acute aneurysm rupture and call for extended antiplatelet medication therapy. This may result in adverse effects or problems involving bleeding. Thus, surgical surgery is still the only effective treatment for para-clinoid aneurysms. [Nonaka, T. et al., 2007]

Previous research has shown that microsurgery may repair para-clinoid aneurysms definitively, permanently, and with a manageable complication rate, but more recent research has shown a worrying risk of new vision impairments [Pasqualin, A. et al., 2016]. Additionally, the difficulty in detecting disease on the medial side of the ICA through the optic-carotid triangle's constrained passageway contributes to the increased frequency of aneurysm remains in this area [Puffer, R.C. et al., 2012]. This paper aimed to study the endovascular management of aneurysms and its effect on the eyes (visual deficit).

PATIENTS AND METHODS

This paper showed a cross-sectional study followed to the outcome. This paper was studying endovascular management of aneurysms and its effect on the eyes (visual deficit) throughout 24th 2021 February to 25th June 2022 in different hospitals in Iraq were focused into the study of aneurysms patients into 35 ages even 65 years. This paper compared between ruptured patients and unruptured patients were included 55 cases into each of the two groups for ages during 35 to 65 years old, by using the SPSS program.

This paper introduced demographic characteristics of aneurysms patients based on age and sex for

RESULTS

both males and females into different groups of ruptured patients and unruptured patients, which can be shown in Table 1, Table 2, and Table 3.

This study was progressing examination of aneurysm patients, which have divided into Ruptured and Unruptured all information can be presented in Table 4. To follow that, this study was extended to get on changes of outcomes patients into aneurysm patients based on sizes which depend on three basics which are Giant, Large, and Regular, that can be found in Table 5.

Furthermore, this paper was progressed within Changes of outcomes patients' problems into visions location into two definitions, right and left, which have been seen in Table 6. Besides to that, this paper was extended to study Changes results of unruptured patients, which include 18 cases. As well as this paper was determined the Changes in results of ruptured patients that, include 23 cases where the changes of outcomes depended on these basics outcomes, which are Complete, Intra-op rupture, not existence, and Post Op infection, where all these results can be seen in Table 7 and Table 8.

This paper contributed to find out the Visual symptom of ruptured patients. where depended on Decreased visual acuity and Visual field deficit, which can be defined into Figure 1. This paper was progressed to distribute Finding results of aneurysm features where determined within Calcification, Thrombosis, and Not existence that all these outcomes have been seen in Figure 2.

To be resulted in this paper resulted to evaluate changes of clip type into ruptured patients within 21 cases which are Angled, Curved, Fenestrated, not existence, and straight.

These outcomes were introduced in Table 9. This paper was studying Changes of clip type into unruptured patients within have 11 cases which. All these outcomes can be resulted in Table 10.

Table 1: Characteristics of aneurysm patients based on age

Statistics		
Characteristics of aneurysm		
N	Valid	55
	Missing	0
Std. Error of Mean		1.36166

Median	46.0000
Mode	37.00 ^a
Variance	101.976
Skewness	.369
Std. Error of Skewness	.322
Range	30.00
Minimum	35.00
Maximum	65.00
Sum	2675.00

Table 2: Characteristics of aneurysm for ruptured patients based on sex

Characteristics of aneurysm					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	16	29.1	29.1	29.1
	male	39	70.9	70.9	100.0
	Total	55	100.0	100.0	

Table 3: Characteristics of aneurysm for unruptured patients based on sex

Characteristics of aneurysm					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	19	34.5	34.5	34.5
	male	36	65.5	65.5	100.0
	Total	55	100.0	100.0	

Table 4: Examination of aneurysm patients

Distributions of aneurysm outcomes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ruptured	38	69.1	69.1	69.1
	Unruptured	17	30.9	30.9	100.0
	Total	55	100.0	100.0	

Table 5: Changes of outcomes patients into aneurysm patients based on sizes.

Distributions of aneurysm outcomes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Giant	11	20.0	20.0	20.0
	Large	16	29.1	29.1	49.1
	Regular	28	50.9	50.9	100.0
	Total	55	100.0	100.0	

Table 6: Changes of outcomes patients' problems into visions location

Visions damages distributions					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	left	23	41.8	41.8	41.8
	Right	32	58.2	58.2	100.0
	Total	55	100.0	100.0	

Table 7: Changes in results of unruptured patients (18 cases)

Distributions of aneurysm outcomes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Complete	15	23.6	23.6	23.6
	Intra-op rupture	1	3.6	3.6	27.3
	not existence	37	67.3	67.3	94.5
	Post Op infection	2	5.5	5.5	100.0
	Total	55	100.0	100.0	

Table 8: Changes in results of ruptured patients (23 cases)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Complete	10	25.5	25.5	25.5
	Intra-op rupture	10	10.9	10.9	36.4
	not existence	32	58.2	58.2	94.5
	Post Op infection	3	5.5	5.5	100.0
	Total	55	100.0	100.0	

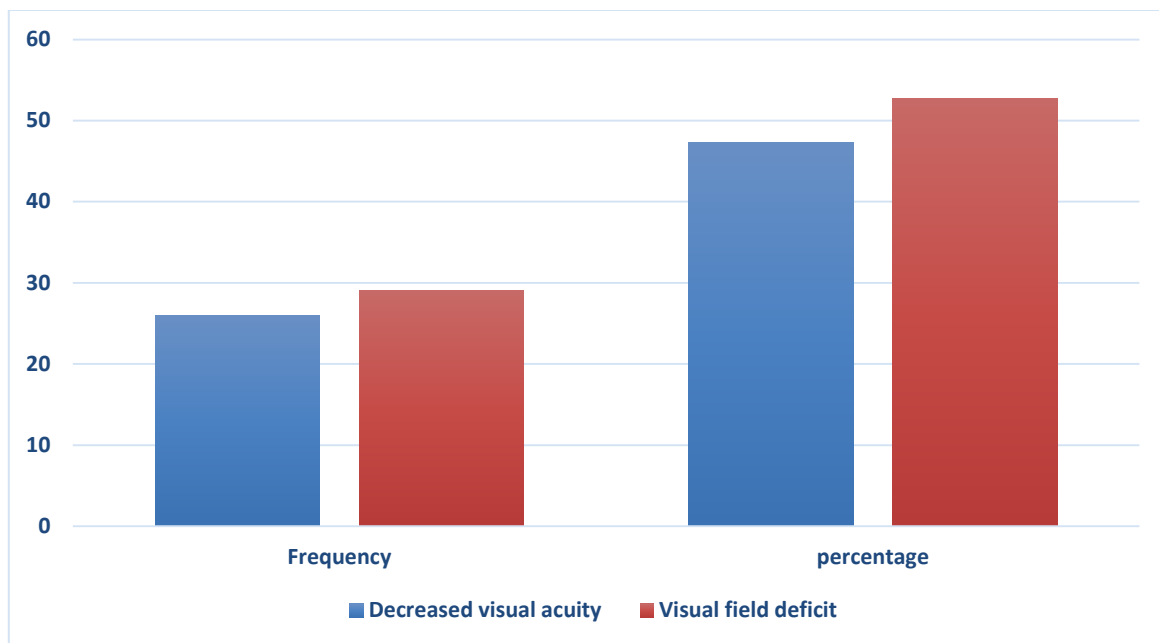


Figure 1: Visual symptoms of ruptured patients

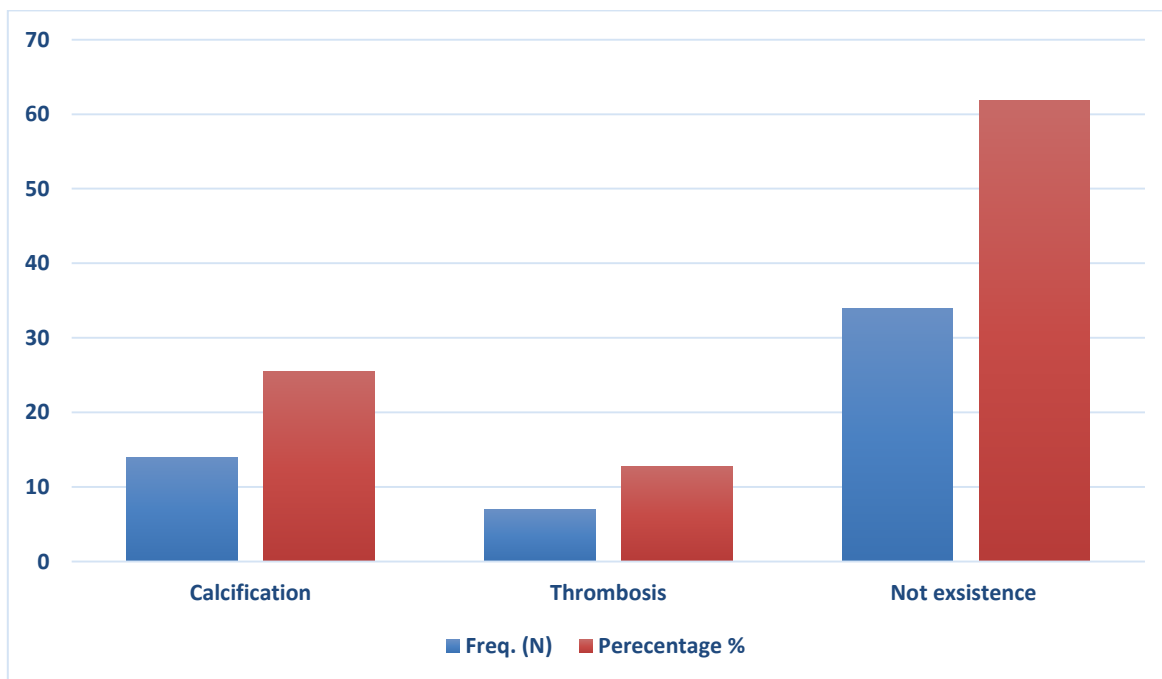


Figure 2: Finding results of aneurysm features

Table 9: Changes of clip type into ruptured patients (21 cases)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Angled	3	5.5	5.5	5.5
	Curved	8	14.5	14.5	20.0
	Fenestrated	7	12.7	12.7	32.7

	not existence	34	61.8	61.8	94.5
	Straight	3	5.5	5.5	100.0
	Total	55	100.0	100.0	

Table 10: Changes of clip type into unruptured patients (11 cases)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Angled	3	5.5	5.5	5.5
	Curved	2	3.6	3.6	9.1
	Fenestrated	2	5.5	5.5	14.5
	not existence	44	80.0	80.0	94.5
	Straight	4	5.5	5.5	100.0
	Total	55	100.0	100.0	

DISCUSSION

This paper contributed to examine and study the endovascular management of aneurysms and its effect on the eyes (visual deficit), which get on ages between 35-65 years. This study compared between the ruptured group and unruptured group, which found through examinations details almost of our results were got on males more than females in both groups.

In the Examination of aneurysm patients, this paper was determined Ruptured (69.1%) and Unruptured (30.9%). This paper was progressed into Changes of outcomes patients into aneurysm patients based on sizes were found Regular (50.9%) was higher in compared with large (29.1%) and Giant (20%).

This study was determined within Changes of outcomes patients' problems into visions location right and left, although (58.2%) and (41.8%). Our results found expansions of examinations of data outcomes were patients got on injured cases in ruptured patients within 23 cases were higher impacted in compared with unruptured patients which it is 18 cases. [Raco, A. et al., 2008]

This study was covered the Visual symptom of ruptured patients into decreased visual acuity and visual field deficit, which find visual field deficits got more patients after operations.

The French studies found that optic nerve manipulation during the dissection about aneurysms, ischemia within the optic process from perforations obstruction as well as spasm, along with direct compression about the optic nerve through the clamp are some potential mechanisms of optic impairment. These mechanisms also include thermal or vibrational injury from high-speed drilling throughout drilling in the anterior clinoid process along with its attachments. Applicable. [Rouchaud, A. et al., 2015; Shimizu, T. et al., 2015]

To further of outcomes, this paper focused on Finding results of aneurysm features which appear to calcification of patients during preoperative in compare with thrombosis.

To compare between the ruptured group and unruptured group, these results showed Changes of clip type into ruptured patients with 21 cases were. Found almost patients got vision curved with 8 cases which Changes of clip type into unruptured patients which they gotten 11 cases of straight vision with only four patients.

CONCLUSION

In conclusion, this paper found the unruptured patients got less impact of aneurysm in compare with ruptured patients, which effect on patients' vision during pre-operative. This study was progressed that almost all of the ruptured patients' group had a lot of cases in Changes of clip type with a comparison with the unruptured patients' group.

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