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Functional Consequences of Aneurysms in Iraqi Patients and Describe The Prognostic Value to Patients for Risk Factor Analysis

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Abstract:

Background: An intracranial aneurysm is an abnormal inflammation of the blood vessels in the brain. We evaluated the functional consequences of aneurysms in Iraqi patients and to describe the prognostic value for patients in the risk factor analysis.

Methods: We conducted a specialised cross-sectional study to assess outcomes of Iraqi patients associated with aneurysms and analyse the effect of risk factors on patients in the long term. Our study collected data from different hospitals in Iraq between 15th July 2022 and 9th March 2023. The data enrolled clinical and demographic outcomes related to 108 cases in patients aged between 25 and 60 years. The dataset was partitioned into two categories. The first category comprised 68 people who were a part of the unruptured group. The second category comprised 40 people who belonged to the ruptured group. The secondary outcomes were devised and analysed with the assistance of the SPSS program, version 25.

Results: Our study found that the majority of elderly patients suffered from aneurysms, with a rate of 70%. Clinical outcomes indicate that females had the highest percentage of cases, with 64.8%, while males comprised 35.2%. Additionally, pre-operative comorbidities outcomes revealed that 54.6% of patients had hypertension, and 26.9% had diabetes mellitus. The study also examined aneurysm locations, with Posterior Communicating Artery cases accounting for 27.8% and Superior Cerebellar Artery cases comprising 16%. In 7% of cases, the posterior cerebral artery is affected,

while in 13.9% of cases, other vessels are involved. Quality of life was evaluated, revealing improved outcomes over time for patients in the unruptured group with a rate of progression from 100% to 50%. In contrast, patients in the ruptured group showed a decline in the rate of survival, with a decrease of 33% in the last year.

Conclusion: Endovascular coiling surgery is considered the optimal surgical procedure for patients with ruptured and unruptured aneurysms.

Key words: Intracranial aneurysms; Glasgow Scale Score; Endovascular coiling.

INTRODUCTION

A brain aneurysm (also called a brain aneurysm or intracranial aneurysm) is formed inside the artery walls of the brain due to impaired vascularization. Over time, the weakened area of the artery becomes thinner and swells (like a balloon) due to blood flow and beating against the vessel wall. Most brain aneurysms form without any symptoms. [1,2]

Over time, and the bulging artery becomes thinner, the aneurysm can burst, causing bleeding in the brain. Symptoms of a ruptured aneurysm often include a sudden onset of a severe headache-most patients describe it as the worst headache they have ever had in their lives. [3]

Cardiovascular diseases are the leading cause of morbidity and mortality in the world; every year, it causes the death of about 17.3 million people1 and is closely related to various risk factors, including hypertension, smoking, alcohol consumption, diet, and obesity, among others. This disease can manifest itself in four categories: coronary heart disease and cerebrovascular disease, peripheral arterial disease, and atherosclerosis/aortic aneurysm. Aneurysm is a disease caused by a permanent stretching of the artery walls. [4,5]

This disease is more common in men than in women and peaks at the age of 60 years, and the end result is rupture, which depends mainly on the diameter of the aneurysm and can lead to death. [6]

The results of treatment of patients with cerebral aneurysms in the acute period of hemorrhage are associated with the highest risk of negative consequences, the cause of which, in most cases, is vascular spasm. Thus, according to a large international study ISAT, the 30-day postoperative mortality rate on an aneurysm in the acute period was 13.4%, and the rate of severe disability and mortality one year after surgery was 30.9%. In local studies evaluating the results of operations in patients in the acute period of hemorrhage, similar data was obtained. Postoperative mortality in the group of patients who underwent direct surgery in most cases was 11%, and severe disability was 14.1%. In a series in which the majority of patients (62%) were operated on intravascular, mortality was 9.3%, and severe disability was 13.6%. [7-14]

All complications of surgical treatment of cerebral aneurysm are divided into intraoperative and postoperative. We mean by intraoperative complications (rupture of an aneurysm, vascular thrombosis, etc.), which can cause a deterioration in the patient's clinical condition in the postoperative period. Postoperative complications were of two types: cerebral (neurological) and exogenous. Neurological complications are classified into transient (within 24 hours) and persistent. [15,16]

When assessing the severity of neurological complications, the following gradation was used: moderate deterioration, severe deterioration, and death. Intermediate deterioration was defined as the appearance or worsening of neurological symptoms in a patient that do not limit his mental, speech,

and motor abilities. The marked deterioration was defined as the appearance or exacerbation of mental disorders and loss of speech, motor, or visual abilities in the patient. [17-19]

Taking into account that patients with complications in the postoperative period can remain in the hospital for a long time, the study was based on the study of the immediate results of treatment, and changes in neurological status were assessed according to the patient's condition for a period of 1-3 weeks after surgery. [20]

PATIENTS AND METHODS:

We had conducted a cross-sectional study specialized to assess outcomes of Iraqi patients associated with aneurysms and analyse risk factors' effect on patients in the long term. Our study was collected data from different hospitals in Iraq between 15th July 2022 to 9th March 2023. Data was enrolled in clinical, demographic outcomes related to 108 cases in patients aged between 25-60 years. Our data was grouped into two sections, where the first was represented an unruptured group with 68 patients, while the second section was a ruptured group with 40. A detailed examination of the data was performed using patient case notes and computerized data resources. The patient's present status (alive or dead) was verified, and basic preoperative, surgical, and postoperative facts were recorded.

This study aimed to develop a methodology by assessing the clinical demographics and outcomes of patients with aneurysms in terms of age, sex, symptoms, Diabetes Mellitus, Hypertension, smoking, aneurysm location, and involvement of specific cerebral arteries, including the Anterior cerebral artery, Anterior communicating artery, Middle cerebral artery bifurcation, Posterior cerebral artery, Posterior communicating artery, Posterior inferior cerebellar artery, and Superior cerebellar artery.

All eligible patients were allocated to the endovascular coiling microsurgical category. Upon admission, each patient in the HHG underwent an assessment. The clinical outcome of each patient at the time of discharge was evaluated using the Glasgow Outcome Scale (GOS) score, categorised as either positive (good recovery, GOS 5; moderate disability, GOS 4) or negative (severe impairment, GOS 2-3; death, GOS 1).

A program that is available for getting was used to conduct the statistical analysis (SPSS version 22.0). Two sample t-tests were used to compare continuous variables having a normal distribution univariately. To examine bivariate relationships between relevant factors and favourable vs. unfavourable results, logistic regression was employed.

RESULTS:

Table 1: *Clinical demographic outcomes of patients with aneurysms based on age.*

		Outcomes
N	Valid	108
	Missing	0
Mean		42.5000
Std. Error of Mean		1.00427
Median		42.5000
Mode		25.00[a]
Std. Deviation		10.43673
Minimum		25.00
Maximum		60.00

Table 2*: Identify the gender of patients with aneurysms.*

		Number of patients	Percentage (%)
V	**Females**	70	64.8
	Males	38	35.2
	Total	108	100.0

Table 3: *Clinical, demographic outcomes of patients with aneurysms based on symptoms.*

		Number of patients	Percentage (%)
	Headaches	44	40.7
	Neck pain	16	14.8
	Numbness of the head	13	12.0
	Pain above the eyes	7	6.5
	Vision changes	28	25.9
	T	108	100.0

Table 4: *Pre-operative comorbidities outcomes.*

		Number of patients	Percentage (%)
V	Diabetes Mellitus	29	26.9
	Hypertension	59	54.6
	None	20	18.5
	T	108	100.0

Table 5: *Smoking effect.*

		Number of patients	Percentage (%)
	No	39	36.1
	Yes	69	63.9
	T	108	100.0

Table 6*: Aneurysm location.*

		Number of patients	Percentage (%)
V	Anterior cerebral artery	14	13.0
	Anterior communicating artery	6	5.6
	Middle cerebral artery bifurcation	11	10.2
	Posterior cerebral artery	15	13.9
	Posterior communicating artery	30	27.8
	Posterior inferior cerebellar artery	14	13.0
	Superior cerebellar artery	18	16.7
	T	***108***	***100.0***

Table 7: *Distribution of patients based on Hunt-Hess grade.*

	Number of patients	Percentage (%)
I	45	41.7%
III	22	20.4
IV	14	13.0
V	27	25.0
T	108	100.0

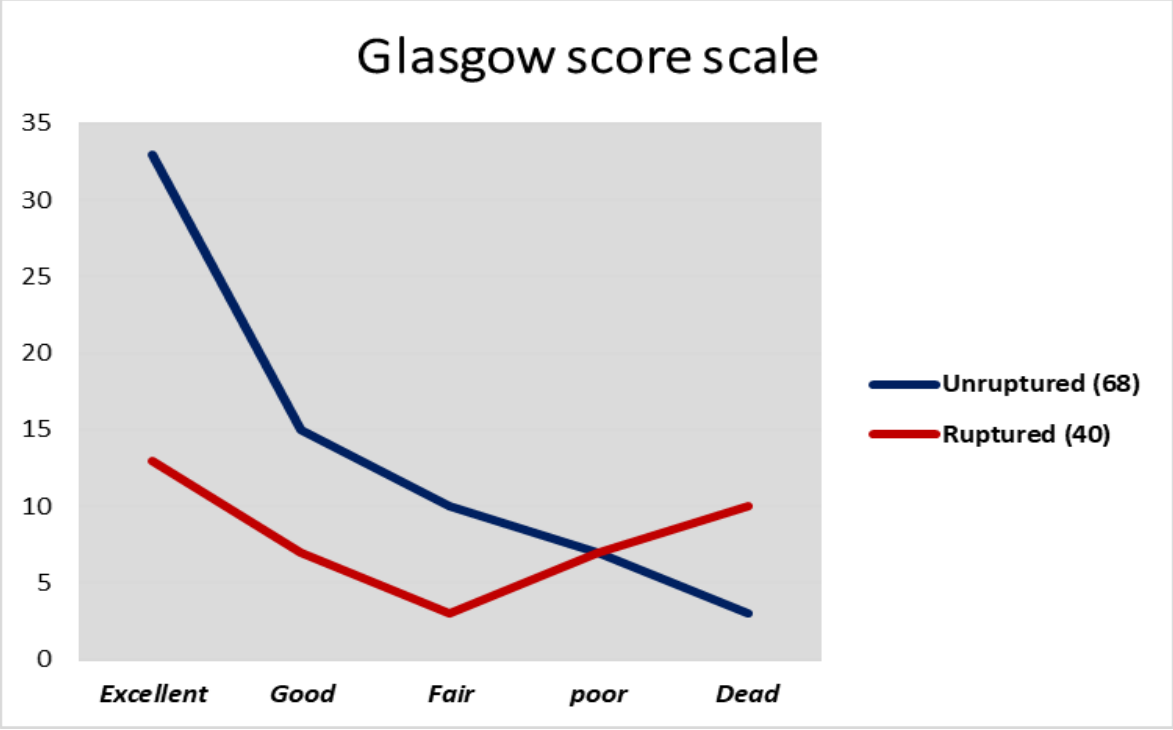

Figure 1: *Assessment of the post-operative outcome of aneurysms treated with coiling according to the Glasgow Scale Score.*

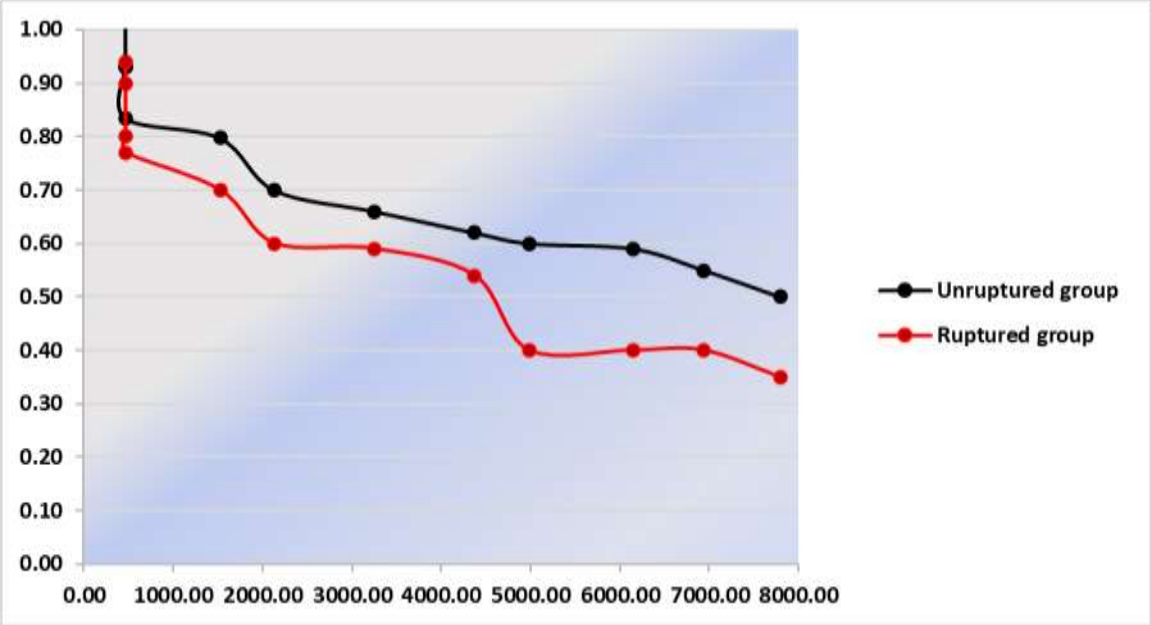

Figure 2: *Secondary outcome measures of the postoperative survival time of the patients.*

Table 7: *Determination of predictive outcomes in relation to risk factors by multivariate logistic analysis.*

Variables	Odds ratio	95% CI	P-value
Age (over 50 years)	1.145	1.066-4.43	3.584
Sex (female)	1.064	0.481-5.511	4.881
Hypertension	0.774	0.641-2.83	2.031
Diabetes	2.31	0.511-7.91	5.82
Smoking	3.92	1.227-9.881	0.8281
Hunt-Hess grade (IV, I)	5.43	2.881-12.56	6.188
Aneurysm location	1.22	0.7881-1.587	1.2155

DISCUSSION:

Our study was conducted assessment clinical demographic outcomes for patients with aneurysm aged between 25 and 60 years. Our study was enrolled that the rate of elderly patients was most suffered of aneurysms with 70% as well as clinical outcomes found females had the highest percentage of cases with 64.8%, while males were 35.2%. Also, we identified clinical outcomes of symptoms, which resulted in 40.7% of patients have headaches and 25.9% have Vision changes, and this shown that these two kinds of symptoms were covered at 50% of total cases. Besides to that, we determined pre-operative comorbidities outcomes where 54.6% of patients have hypertension and diabetes mellitus with 26.9%.

To progress of outcomes, this study was defined Aneurysm location outcomes in terms of the Posterior communicating artery in 27.8% of cases, the Superior cerebellar artery with 16.7% of cases, and the Posterior cerebral artery with 13.9% of cases. Furthermore, our results were classified

the severity of a subarachnoid hemorrhage in patients with Aneurysm, and 41.7% of total cases have their severity of type I, and cases with a severity of type V was 25.0%.

Moreover, we assessed the postoperative outcome of aneurysms treated with coiling according to the Glasgow Scale Score, where this coiling surgery was more treatment used for these cases had presented a higher rate of success surgery in the unruptured more than ruptured group. To the Glasgow Scale Score side, the rate of patients in the unruptured group have 33 cases with excellent, seven poor, and three dead, while the rate of patients in the ruptured group have 13 cases with excellent, 7 cases are poor, and 10 cases are considered as dead cases. In addition, we evaluated the quality of life, which found that patients in the unruptured group have improved with time, where the rate of patients progressed from 100%-50%, but patients in the ruptured group showed a decline in the rate of survival life with 33% in last year where we found significant differences in term of sex, risk factors, HHG, were between two groups followed into coiling surgery.

According to recent studies, it has been found that surgical treatment for unruptured intracranial aneurysms can result in low patient mortality rates, making it an optimal treatment option. Endovascular coiling has been identified as the most efficient treatment for patients with unruptured middle cerebral artery aneurysms, with successful outcomes in terms of patients' survival rate and reduced disability occurring within one year. Furthermore, endovascular coiling has demonstrated a decreased rate of complications and improved surgical outcomes compared to the alternative surgical procedure known as clipping. [21]

Based on a study conducted in America, it was confirmed that the use of Endovascular coiling in the treatment of patients with unruptured aneurysms is increasing over time. Consequently, the dissemination of surgical procedures is now permissible and widespread in all hospitals. [22]

Previous studies have shown that women are more susceptible to cranial aneurysms compared to men. However, men have high blood pressure, which is a major risk factor for unfavorable treatment outcomes and is associated with subarachnoid hemorrhage. [23]

Previous studies have confirmed that high blood pressure, diabetes, and age significantly affect patients with aneurysms. The patient's neurological condition before the surgery and age may cause surgical complications and worse outcomes, particularly for those with ruptured intracranial aneurysms. Therefore, it is essential to consider these factors when planning treatment. [24]

A British study has indicated that high blood pressure is prevalent in specific subgroups of individuals with aneurysms, particularly women aged between 18 and 54 years. Additionally, high blood sugar levels in patients may result in poor outcomes for most individuals experiencing subarachnoid hemorrhage. On the other hand, French studies suggest that the structural changes in the arterial wall caused by chronic high blood pressure might lead to the development of intracranial aneurysms. [25]

CONCLUSION:

Endovascular coiling is regarded as the most effective surgical procedure for patients with both ruptured and unruptured aneurysms. Our study demonstrated that patients with unruptured aneurysms experienced superior outcomes compared to those with ruptured aneurysms. In addition, the Glasgow Scale demonstrated a high frequency of patients experiencing excellent health following surgery, along with a very low mortality rate and stable survival rate in the last years of treatment for the group of patients with unruptured aneurysms. On the flip side, there was a rise in mortality among patients with ruptured aneurysms and an inconsistent hospitalization rate, contributing to the higher death rate. This was attributed to the low number of patients in this group. Furthermore, age, smoking, and gender are long and short-term risk factors for patients. Our findings

indicate that women suffered from more intracranial aneurysms and had a higher mortality rate than men.

REFERENCES:

1. Brinjikji W, Rabinstein AA, Lanzino G, Kallmes DF, Cloft HJ. Effect of age on outcomes of treatment of unruptured cerebral aneurysms: a study of the national inpatient sample 2001-2008. *Stroke.* 2011 May;42 (5):1320–1324.
2. Carter BS, Sheth S, Chang E, Sethl M, Ogilvy CS. Epidemiology of the size distribution of intracranial bifurcation aneurysms: smaller size of distal aneurysms and increasing size of unruptured aneurysms with age. *Neurosurgery.* 2006 Feb;58 (2):217–223. discussion 217-23.
3. Higashida RT, Lahue BJ, Torbey MT, Hopkins LN, Leip E, Hanley DF. Treatment of unruptured intracranial aneurysms: a nationwide assessment of effectiveness. *AJNR Am J Neuroradiol.* 2007 Jan;28 (1):146–151.
4. Horiuchi T, Tanaka Y, Hongo K. Surgical treatment for aneurysmal subarachnoid hemorrhage in the 8th and 9th decades of life. *Neurosurgery.* 2005 Mar;56 (3):469–475. discussion 469-75.
5. Hutchinson PJ, Power DM, Tripathi P, Kirkpatrick PJ. Outcome from poor grade aneurysmal subarachnoid hemorrhage-which poor grade subarachnoid haemorrhage patients benefit from aneurysm clipping? *Br J Neurosurg.* 2000 Apr;14 (2):105–109.
6. Inagawa T. Management outcome in the elderly patient following subarachnoid hemorrhage. *J Neurosurg.* 1993 Apr;78 (4):554–561.
7. Iosif C, Di Maria F, Sourour N, Degos V, Bonneville F, Biondi A, et al. Is a high initial World Federation of Neurosurgery (WFNS) grade really associated with a poor clinical outcome in elderly patients with ruptured intracranial aneurysms treated with coiling? *J Neurointerv Surg.* 2014 May 01;6 (4):286–290.
8. Jang EW, Jung JY, Hong CK, Joo JY. Benefits of surgical treatment for unruptured intracranial aneurysms in elderly patients. *J Korean Neurosurg Soc.* 2011 Jan;49 (1):20–25.
9. Josephson SA, Douglas VC, Lawton MT, English JD, Smith WS, Ko NU. Improvement in intensive care unit outcomes in patients with subarachnoid hemorrhage after initiation of neurointensivist co-management. *J Neurosurg.* 2010 Mar;112 (3):626–630.
10. Khosla A, Brinjikji W, Cloft H, Lanzino G, Kallmes DF. Age-related complications following endovascular treatment of unruptured intracranial aneurysms. *AJNR Am J Neuroradiol.* 2012 May;33 (5):953–957.
11. Kwon SC, Kwon OK. Endovascular coil embolization of unruptured intracranial aneurysms: a Korean multicenter study. *Acta Neurochir (Wien)* 2014 May;156 (5):847–854.
12. Moroi J, Hadeishi H, Suzuki A, Yasui N. Morbidity and mortality from surgical treatment of unruptured cerebral aneurysms at Research Institute for Brain and Blood Vessels-Akita. *Neurosurgery.* 2005 Feb;56 (2):224–231. discussion 224-31.
13. Naidech AM, Bendok BR, Tamul P, Bassin SL, Watts CM, Batjer HH, et al. medical complications drive length of stay after brain hemorrhage: a cohort study. *Neurocrit Care.* 2009;10 (1):11–19.

14. Raja PV, Huang J, Germanwala AV, Gailloud P, Murphy KP, Tamargo RJ. Microsurgical clipping and endovascular coiling of intracranial aneurysms: a critical review of the literature. *Neurosurgery.* 2008 Jun;62 (6):1187–1202. discussion 1202-3.
15. Greving JP, Rinkel GJ, Buskens E, et al.. Cost-effectiveness of preventive treatment of intracranial aneurysms: new data and uncertainties. Neurology 2009; 73:258–65 10.1212/01.wnl.0b013e3181a2a4ea
16. Brown RD Jr, Broderick JP. Unruptured intracranial aneurysms: epidemiology, natural history, management options, and familial screening. Lancet Neurol 2014; 13:393–404 10.1016/S1474-4422 (14)70015-8
17. Hunt WE, Hess RM. Surgical risk as related to time of intervention in the repair of intracranial aneurysms. J Neurosurg 1968; 28:14–20 10.3171/jns.1968.28.1.0014
18. Frontera JA, Claassen J, Schmidt JM, et al. Prediction of symptomatic vasospasm after subarachnoid hemorrhage: the modified Fisher scale. Neurosurgery 2006; 59:21–27; discussion 21–27 10.1227/01.NEU.0000218821.34014.1B
19. van Swieten JC, Koudstaal PJ, Visser MC, et al. Interobserver agreement for the assessment of handicap in stroke patients. Stroke 1988; 19:604–07 10.1161/01.STR.19.5.604 [
20. Elijovich L, Higashida RT, Lawton MT, et al.; Cerebral Aneurysm Rerupture After Treatment (CARAT) Investigators. Predictors and outcomes of intraprocedural rupture in patients treated for ruptured intracranial aneurysms: the CARAT study. Stroke 2008; 39:1501–06 10.1161/STROKEAHA.107.504670
21. Cloft HJ, Kallmes DF. Cerebral aneurysm perforations complicating therapy with Guglielmi detachable coils: a meta-analysis. AJNR Am J Neuroradiol 2002; 23:1706–09
22. Sluzewski M, Bosch JA, van Rooij WJ, et al. Rupture of intracranial aneurysms during treatment with Guglielmi detachable coils: incidence, outcome, and risk factors. J Neurosurg 2001; 94:238–40 10.3171/jns.2001.94.2.0238
23. Tummala RP, Chu RM, Madison MT, et al. Outcomes after aneurysm rupture during endovascular coil embolization. Neurosurgery 2001; 49:1059–66; discussion 1066–67
24. Charpentier C, Audibert G, Guillemin F, et al. Multivariate analysis of predictors of cerebral vasospasm occurrence after aneurysmal subarachnoid hemorrhage. Stroke 1999; 30:1402–08 10.1161/01.STR.30.7.1402
25. Pierot L, Cognard C, Anxionnat R, et al. Remodeling technique for endovascular treatment of ruptured intracranial aneurysms had a higher rate of adequate postoperative occlusion than did conventional coil embolization with comparable safety. Radiology 2011; 258:546–53 10.1148/radiol.10100894
26. Pierot L, Spelle L, Vitry F. Immediate clinical outcome of patients harboring unruptured intracranial aneurysms treated by endovascular approach: results of the ATENA study. Stroke 2008; 39:2497–504 10.1161/STROKEAHA.107.512756