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TEN-YEAR EXPERIENCE OF A TERTIARY CENTER WITH GIANT ABDOMINAL AORTIC ANEURYSMS: A RETROSPECTIVE ANALYSIS

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Abstract

Introduction: *The risk of rupture for abdominal aortic aneurysms (AAAs) is primarily influenced by their diameter with the likelihood of rupture increasing exponentially as the aneurysm enlarges. Nowadays, giant AAAs are relatively rare in clinical practice due to earlier diagnosis and treatment. This study aimed to analyze the treatment and prognosis of giant aneurysms comparing with non-giant AAAs within our center´s prospective registry.*

Methods: *We identified all AAAs treated at our center exceeding 9 cm in diameter from surgical records between January 1, 2013, and September 10, 2024. Demographic data, risk factors, anatomical characteristics, treatments, and outcomes were recorded. Furthermore, we analyzed and compared the anatomical features and outcomes of giant aneurysms with non-giant AAAs treated in our department (non-giant AAAs) from 2019 and 2023.*

Results: *A total of 24 patients with giant AAAs were identified, with a mean age of 77.46±9.03 years, and the majority were male (95.8%). Rupture was significantly more frequent in the giant AAAs cohort (54.2% vs. 9.6%, $p<0.001$). Additionally, Giant AAAs were significantly less likely to undergo endovascular aneurysm repair (EVAR) (33.33% vs. 75.53%, $p < 0.001$), but with a higher risk of reintervention due to complications at 30 days (18.18% vs. 1.18%, $p < 0.001$) and 1 year (18.18% vs. 3.53%, $p < 0.001$) in non-ruptured sub-group.*

Conclusion: *Giant AAAs are predominantly ruptured at presentation and primarily managed with open surgical repair. When treated with EVAR, there was a higher risk of reintervention compared to non-giant AAAs.*

Keywords: *Abdominal Aortic Aneurysms management; Long-term outcomes; Surgical intervention.*

INTRODUCTION

Abdominal aortic aneurysms (AAAs) have an incidence of approximately 4%–8% in men and 1.3% in age-adjusted women. Their prevalence increases with age, affecting up to 9% of adults over 65 years. Despite the growing body of literature aiming to optimize three-dimensional aneurysm assessment, aneurysm diameter remains the strongest predictor of rupture risk [1, 2].

Most AAAs (96%) measure less than 6 cm in diameter[1, 3]. The annual risk of rupture rises to approximately 14% for AAAs larger than 6 cm and increases exponentially to 30%–50% once the diameter exceeds 8 cm [1, 4, 5]. Surgical intervention is generally recommended when the diameter surpasses 55 mm in men and 50 mm in women [1, 2, 4].

A precise definition of what constitutes a "giant" AAA has not yet been established, and its prevalence in the general population remains unknown[1, 4, 5]. In clinical practice, giant AAAs have become increasingly rare due to widespread use of imaging modalities, enhanced screening programs, structured monitoring protocols, and established repair guidelines. However, giant AAAs often present complex anatomical features that pose unique challenges for vascular surgeons. These include a short proximal neck, pronounced angulation, and extensive intraluminal thrombus complicating the endovascular approach, as well as displacement of abdominal organs and mass effect that increase the complexity of open repair [1, 4, 5].

The aim of this study is to retrospectively evaluate the management of giant AAAs in our center by analyzing their anatomical characteristics, demographic data, risk factors, treatment strategies, and clinical outcomes. Furthermore, we compare these findings with those for non-giant AAAs from our department's prospective registry.

METHODS

Study design

This was a descriptive, observational, retrospective study.

Patients and definitions

"Giant" AAAs were defined as those exceeding 9 cm in maximum diameter. All AAAs treated at our center between January 1, 2013, and September 10, 2024, with a diameter greater than 9 cm were identified and included based on surgical records. Additionally, anatomical characteristics and outcomes of giant AAAs were compared with those of non-giant AAAs (diameter <9 cm) treated between 2019 and 2023, which were included in our center's prospective registry.

Exclusion criteria were false aneurysms, penetrating aortic ulcers (PAUs), thoracoabdominal aneurysms, aortic dissections, and cases in which patient data originated from other hospitals and could not be retrieved.

Patients were further stratified into two subgroups: ruptured AAAs and non-ruptured AAAs.

Data collection

Data were extracted from surgical and clinical records. Variables included demographic information and aneurysm characteristics (size, shape, and location). Risk factors and comorbidities were recorded, including cardiac, pulmonary, and cerebrovascular disease, hypertension, diabetes mellitus, chronic limb ischemia, smoking history, and family history of AAA. Clinical presentation at admission, presence of rupture, surgical approach, and intraoperative or postoperative complications were documented.

Additional variables included hospital length of stay, intensive care unit (ICU) stay, need for reintervention within 30 days (with causes), 30-day and 1-year mortality, and need for additional procedures within 1 year.

Anatomical characteristics were assessed by reviewing computed tomography angiography (CTA), when available. Key features relevant to treatment decisions (2)—including suitability for open repair (OR) or endovascular aneurysm repair (EVAR)—were recorded: infrarenal aortic neck diameter (outer-to-outer), neck length, infrarenal neck angulation, sac morphology (saccular or fusiform), and relation to renal arteries (infrarenal, pararenal, or juxtarenal).

Outcomes

The primary outcomes were 30-day and 1-year mortality. Secondary outcomes included intraoperative and postoperative complications, hospital and ICU length of stay, reintervention at 30 days, and additional procedures at 1 year.

Statistical analysis

Data were analyzed using IBM SPSS Statistics version 29.0 (Predictive Solutions, Pittsburgh, PA, USA). Categorical variables were expressed as counts (n) and percentages; continuous variables were summarized as mean with standard deviation or median with interquartile range. Normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Group comparisons for continuous variables were performed with the t-test or Wilcoxon test, as appropriate, and multi-group comparisons with one-way ANOVA or Kruskal-Wallis test. Categorical variables were analyzed using the chi-square test or Fisher's exact test. A p-value <0.05 was considered statistically significant.

Ethics

The study was conducted in accordance with the principles of the Declaration of Helsinki (1975). Patient data were anonymized and securely stored, and all participants provided informed consent for the use of their data in clinical research.

RESULTS

Sample characteristics

A total of 118 patients were included: 24 with giant AAAs and 94 with non-giant AAAs. The mean age of the cohort was 73.9 ± 8.9 years, and 113 patients (95.8%) were male. The mean maximum aneurysm diameter was 10.2 ± 1.6 cm in the giant AAA group and 5.7 ± 0.8 cm in the non-giant group. Clinical and demographic characteristics of patients with giant AAAs are summarized in Table 1.

Outcomes and comparative analysis (giant vs. non-giant AAA)

Comparison between the two groups revealed statistically significant differences in both primary outcomes: 30-day mortality (29.2% vs. 2.1%, $p < 0.001$) and 1-year mortality (33.3% vs. 8.5%, $p < 0.001$).

Other significant differences were observed in median age (77.5 ± 9.0 vs. 73.0 ± 8.7 years, $p = 0.026$), maximum AAA diameter (10.2 ± 1.6 vs. 5.7 ± 0.8 cm, $p < 0.001$), and prevalence of rupture (54.2% vs. 9.6%, $p < 0.001$). Treatment modality also differed significantly, with giant AAAs more frequently undergoing open repair (66.7% vs. 24.5%, $p < 0.001$) and non-giant AAAs more often treated with EVAR (33.3% vs. 75.5%, $p < 0.001$).

No significant differences were found regarding sex distribution (95.7% vs. 95.8%, $p = 0.985$), infrarenal neck diameter (19.1± 10.7 vs. 20.2 ± 7.7 mm, $p = 0.667$), neck length (22.1 ± 15.9 vs. 25.9 ± 16.25 mm, $p = 0.350$), or infrarenal neck angulation (34.3°± 10.7 vs. 34.6°± 10.7, $p = 0.969$). Additional data are presented in Table 1.

Subgroup analysis (ruptured vs. non-ruptured AAA)

Patients were stratified into ruptured (n = 22) and non-ruptured (n = 96) AAAs.

Ruptured AAAs: No statistically significant differences were observed in 30-day mortality (53.9% vs. 22.2%, p = 0.138). However, 1-year mortality was higher in the giant AAA group (61.5% vs. 33.3%, p < 0.001). Giant AAAs also showed higher rates of intraoperative complications (46.2% vs. 0%, p = 0.013), postoperative complications including cardiac events (23.1% vs. 0%, p = 0.029) and need for renal support (23.1% vs. 0%, p = 0.029), as well as higher rates of reintervention at 1 year (7.7% vs. 0%, p = 0.013). Details are provided in Table 2. The annual incidence of ruptured AAAs is shown in Figure 1.

Non-ruptured AAAs: No 30-day deaths occurred in either group. One-year mortality was significantly higher in the non-giant AAA group (0.0% vs. 5.9%, p = 0.008). Giant AAAs were more frequently treated with open repair (54.5% vs. 22.4%, p = 0.022), while EVAR was more common in non-giant AAAs (45.5% vs. 77.6%, p = 0.022). Giant AAAs were also associated with longer hospital stay (median 13.1 vs. 5.5 days, p < 0.001) and higher rates of reintervention at 30 days (18.2% vs. 1.2%, p < 0.001) and at 1 year (18.2% vs. 3.5%, p < 0.001). Details are provided in Table 3.

DISCUSSION

Giant abdominal aortic aneurysms (AAAs) are rare and complex, with few cases reported in the literature (1). In this study, we evaluated their anatomical and clinical characteristics, treatment strategies, and outcomes, and compared them with those of non-giant AAAs.

Aneurysm size is the most widely recognized predictor of rupture [1, 5–7]. Rupture remains the most severe complication, associated with high mortality: even with prompt intervention, only about 50% of patients survive beyond 30 days [1, 8, 9]. In our cohort, the 30-day mortality among patients with ruptured AAAs was 40.9%, with 31.82% occurring in the giant AAA subgroup.

Although size is the dominant risk factor [1, 2, 4, 5], the mechanisms allowing some giant AAAs to grow without rupturing remain unclear. Biomechanical models suggest that rupture risk is influenced by factors beyond Laplace's law, such as peak wall stress, symmetry, and shape [1, 10–14]. In our analysis, symmetry was the only parameter evaluated; fusiform morphology predominated in ruptured giant AAAs (61.5%). This does not support shape as an independent predictor of rupture, reinforcing that aneurysm size remains paramount. The higher prevalence of rupture among giant AAAs in our series further underscores this point.

The mean age of patients with giant AAAs was 77.5 years, similar to prior reports [1]. Portugal does not have a national AAA screening program, but our department follows European guidelines [2], which recommend screening in men ≥65 years, smokers, first-degree relatives of AAA patients, and those with other peripheral aneurysms. The advanced age and high smoking prevalence in our study suggest that at-risk individuals are not consistently referred for screening, emphasizing the need for greater awareness among primary care providers.

A strong male predominance was observed, consistent across all subgroups and in line with previous studies [15]. This aligns with findings by Katz et al.[15], who reported a male-to-female ratio of 4.8:1 for intact AAAs and 5:1 for ruptured AAAs. The gender disparity is likely due to higher levels of estrogen receptor alpha in female vasculature, which reduces metalloproteinase activity and, consequently, extracellular matrix degradation, a key contributor to AAA formation[1, 16].

Symptomatology in our cohort was variable. While most giant AAAs are described as symptomatic in the literature [1], nearly half of our patients were asymptomatic. Symptoms were more common in ruptured cases, whereas non-ruptured AAAs were frequently silent. This aligns with the natural history of AAAs, which often remain undetected until rupture presents with collapse, pain, or abdominal distension [2].

Management of giant AAAs is particularly challenging. Open repair remains the preferred approach due to frequent anatomical constraints limiting EVAR feasibility [1]. Most available stent grafts require a neck diameter of 18–32 mm, neck length ≥15 mm, and infrarenal angulation ≤60° [1, 17, 18]. In giant AAAs, severe angulation, tortuosity, and hostile iliac anatomy often preclude EVAR [1]. The EUROSTAR registry [19] further showed that larger aneurysms are associated with more endoleaks, reflecting the correlation between size and adverse anatomy.

In our study, giant AAAs were more often treated with open repair, regardless of rupture status. Although no significant differences were found in neck dimensions or angulation compared with non-giant AAAs, mean neck length was shorter in giant AAAs (22.1 ± 15.9 vs. 25.9 ± 16.25 mm). The lack of statistical significance may reflect the limited sample size. Additionally, over half of the giant AAAs were ruptured, requiring urgent surgery and limiting the feasibility of EVAR.

Intraoperative complications were more frequent in ruptured giant AAAs, including vascular injury, intraoperative death, and uncontrollable hemorrhage. These are likely related to anatomical distortion and the technical difficulty of achieving proximal control in large, ruptured aneurysms. Postoperative complications were also more common in ruptured giant AAAs, consistent with prior studies [1, 2], reflecting both rupture status and the complexity of open repair in this setting.

In non-ruptured cases, reinterventions at 30 days and 1 year were more frequent after EVAR, primarily due to endoleaks and iliac branch occlusions. Nearly half of the non-ruptured giant AAAs in our study were treated with EVAR, and these patients experienced higher rates of both short- and long-term complications. Taken together, these findings suggest that while EVAR may be feasible in selected giant AAAs, open repair may provide more durable results in this challenging patient population.

Table 1 **Demographic and clinic characteristics of the two patient groups (Giant vs. Non-Giant AAA) and a comparative analysis**

Variables			Giant AAA (n=24)		Non-Giant AAA (n=94)		
			n (%)	Mean (SD)	n (%)	Mean (SD)	p Value
Gender	Masculine		23 (95.80)		90 (95.74)		0.985
	Feminine		1 (4.20)		4 (4.26)		
Age				77.46 (9.03)		72.96 (8.67)	0.026
Aneurysm Location	Infrarrenal		17 (70.80)		79 (84.04)		0.202
	Pararrenal		2 (8.30)		2 (2.13)		
	Juxtarrenal		5 (20.80)		13 (13.83)		
Aneurysm Shape	Fusiform		18 (75.00)		91 (96.81)		<0.001
	Saccular		6 (25.00)		3 (3.19)		
Hypertension			22 (91.70)		71 (75.53)		0.211
Diabetes Mellitus			6 (25.00)		24 (25.53)		0.957
Chronic limb ischemia			5 (20.80)		29 (30.85)		0.383
Dyslipidemia			17 (70.80)		72 (76.60)		0.462
Smoker	Never smoked		8 (33.30)		8 (8.51)		0.013
	Ex-smoker		10 (41.70)		55 (58.51)		
	Active smoker		6 (25.00)		27 (28.72)		
Family history	Nonregistered		23 (95.80)		92 (97.87)		0.109
	Positive		1 (4.20)		0 (0.00)		
Cardiac Disease			6 (25.00)		36 (38.30)		0.401
Pulmonary Disease			6 (25.00)		39 (41.49)		0.138
Cerebrovascular disease			3 (12.50)		15 (15.96)		0.674
Symptoms at admission	Abdominal pain		5 (20.80)		8 (8.51)		<0.001
	Lumbar pain		7 (29.20)		3 (3.19)		
	Asymptomatic		11 (45.80)		81 (86.17)		
Ruptured AAA			13 (54.20)		9 (9.57)		<0.001
Type of surgical procedure	Open Surgery	Aorto-aortic interposition graft	7 (29.20)		9 (9.57)		<0.001
		Aorto-bi-iliac interposition graft	3 (12.50)		10 (10.63)		
		Aorto-bifemoral bypass	5 (20.80)		4 (4.25)		
	Endovascular surgery	EVAR	7 (29.20)		71 (75.53)		
Intraoperative complications	Iatrogenic vascular injury		2 (8.30)		0 (0.00)		<0.001
	Death		3 (12.50)		0 (0.00)		
	Uncontrollable hemorrhage with multiorgan dysfunction		1 (4.20)		3 (3.19)		
Postoperative complications	Infection		5 (20.80)		19 (20.21)		0.019
	Stroke		0 (0.00)		0 (0.00)		0.106
	Need for renal support		3 (12.50)		0 (0.00)		<0.001
	Respiratory failure		6 (25.00)		6 (6.38)		<0.001
	Mesenteric ischemia		2 (8.30)		1 (1.06)		<0.001
	Abdominal compartment syndrome		1 (4.20)		0 (0.00)		<0.001
Post endovascular surgery endoleak	Ia		2 (8.30)		1 (1.06)		0.111
	Ib		1 (4.20)		1 (1.06)		
	II		2 (8.30)		16 (17.02)		
30 days mortality			7 (29.20)		2 (2.13)		<0.001
1 year mortality			8 (33.30)		8 (8.51)		<0.001

AAA – Abdominal aortic aneurysm; EVAR – Endovascular Aortic repair

Table 2 **Comparative Analysis of Ruptured AAA (Giant vs Non-Giant AAA)**

Variables			Giant AAA (n=24)		Non-Giant AAA (n=94)		
			n (%)	Mean (SD)	n (%)	Mean (SD)	p Value
Gender	Masculine		12 (92.30)		8 (88.89)		0.784
	Feminine		1 (7.69)		1 (11.11)		
Age				77.46 (9.03)		72.96 (8.67)	0.293
Aneurysm Location	Infrarrenal		7 (53.85)		8 (88.89)		0.211
	Pararrenal		1 (7.69)		0 (0.00)		
	Juxtarrenal		5 (38.46)		1 (11.11)		
Aneurysm Shape	Fusiform		8 (61.54)		7 (77.78)		0.421
	Saccular		5 (38.46)		2 (22.22)		0.421
Neck diameter				14.69 (11.22)		22.12 (4.17)	0.098
Neck length				17.94 (16.70)		28.36 (18.55)	0.242
Infrarrenal neck angulation				40.12 (23.77)		32.80 (35.54)	0.672
Hypertension			12 (92.30)		5 (55.56)		0.117
Diabetes Mellitus			4 (30.77)		2 (22.22)		0.658
Chronic limb ischemia			4 (30.77)		0 (0.00)		0.106
Dyslipidemia			9 (69.23)		6 (66.67)		0.451
Smoker	Never smoked		5 (38.46)		1 (11.11)		0.244
	Ex-smoker		5 (38.46)		6 (66.67)		
	Active smoker		3 (23.08)		1 (11.11)		
Cardiac Disease			3 (23.08)		3 (33.33)		0.595
Pulmonary Disease			3 (23.08)		4 (44.44)		0.290
Cerebrovascular disease			3 (23.08)		1 (11.11)		0.474
Symptoms at admission	Abdominal pain		5 (38.46)		5 (55.56)		0.725
	Asymptomatic		1 (7.69)		2 (22.22)		
	Lumbar Pain		6 (46.15)		1 (11.11)		
Type of surgical procedure	Open Surgery	Aorto-aortic interposition graft	5 (38.46)		1 (11.11)		0.119
		Aorto-bi-iliac interposition graft	2 (15.38)		1 (11.11)		
		Aorto-bifemoral bypass	3 (23.08)		2 (22.22)		
	Endovascular surgery	EVAR	3 (23.08)		5 (55.56)		
Intraoperative complications	Iatrogenic vascular injury		2(15.38)		0 (0.00)		0.013
	Death		3(23.08)		0 (0.00)		
	Uncontrollable hemorrhage with multiorgan dysfunction		1 (7.69)		0 (0.00)		
Postoperative complications	Infection		4 (30.77)		2 (22.22)		0.309
	Stroke		0 (0.00)		0 (0.00)		0.279
	Cardiac event		3 (23.08)		0 (0.00)		0.029
	Need for renal support		3 (23.08)		0 (0.00)		0.029
	Respiratory failure		5 (38.46)		3 (33.33)		0.227
	Mesenteric ischemia		2 (15.38)		0 (0.00)		0.106
	Abdominal compartment syndrome		1 (7.69)		0 (0.00)		0.184
30 days mortality			7 (53.85)		2 (22.22)		0.138
1 year mortality			8 (61.54)		3 (33.33)		0.095
Requiring additional procedures within 30 days	Lower limb compartment syndrome		1 (7.69)		0 (0.00)		0.053
	Popliteal aneurysm occlusion		0 (0.00		1 (11.11)		
	Occlusion of an iliac branch		0 (0.00		1 (11.11)		
Requiring additional procedures at 1 year	Endoleak Type 1 and 2		1 (7.69)		0 (0.00)		0.013
Length of hospital stays				18.31 (37.27)		8.13 (4.22)	0.355
Duration of ICU admission				9.77 (18.75)		3.38 (2.77)	0.424

AAA – Abdominal aortic aneurysm; EVAR – Endovascular Aortic repair

Table 3 **Comparative Analysis of Non-Ruptured AAA (Giant vs Non-Giant AAA)**

Variables			Giant AAA (n=24)		Non-Giant AAA (n=94)		
			n (%)	Mean (SD)	n (%)	Mean (SD)	p Value
Gender	Masculine		11 (100)		82 (96.47)		0.527
	Feminine		0 (0.00)		3 (3.53)		
Age				76.45 (6.29)		72.91 (8.66)	0.193
Aneurysm Location	Infrarrenal		10 (90.91)		71 (83.52)		0.211
	Pararrenal		1 (9.09)		2 (2.35)		
	Juxtarrenal		0 (0.00)		12 (14.11)		
Aneurysm Shape	Fusiform		10 (90.91)		84 (95.82)		0.220
	Saccular		1 (9.09)		1 (1.18)		0.084
Neck diameter				23.05 (8.91)		20.01 (7.94)	0.266
Neck length				25.80 (15.09)		25.69 (16.11)	0.984
Infrarrenal neck angulation				30.48 (13.38)		34.80 (22.39)	0.574
Hypertension			10 (90.91)		66 (77.64)		0.579
Diabetes Mellitus			2 (18.18)		22 (25.88)		0.579
Chronic limb ischemia			1 (9.09)		29 (34.12)		0.191
Dyslipidemia			8 (72.72)		66 (77.64)		0.765
Smoker	Never smoked		3 (27.27)		7 (8.24)		0.254
	Ex-smoker		5 (45.45)		49 (57.65)		
	Active smoker		3 (27.27)		26 (30.59)		
Cardiac Disease			3 (27.27)		33 (38.82)		0.693
Pulmonary Disease			3 (27.27)		35 (41.18)		0.375
Cerebrovascular disease			0 (0.00)		14 (16.47)		0.145
Symptoms at admission	Abdominal pain		**0 (0.00)**		3 (3.53)		0.326
	Asymptomatic		**10 (90.91)**		80 (94.12)		
	Lumbar Pain		**1 (9.09)**		1 (1.18)		
Type of surgical procedure	Open Surgery	Aorto-aortic interposition graft	2 (18.18)		8 (9.41)		0.022
		Aorto-bi-iliac interposition graft	2 (18.18)		9 (10.59)		
		Aorto-bifemoral bypass	2 (18.18)		2 (2.35)		
	Endovascular surgery	EVAR	5 (45.45)		66 (77.64)		
Intraoperative complications	Femoral access complication		1 (9.09)		0 (0.00)		0.267
	Uncontrollable hemorrhage with multiorgan dysfunction		0 (0.00)		3 (3.53)		
Postoperative complications	Infection		3 (27.27)		5 (5.88)		0.052
	Stroke		0 (0.00)		5 (5.88)		0.409
	Cardiac event		0 (0.00)		1 (1.18)		0.718
	Need for renal support		0 (0.00)		0 (0.00)		
	Respiratory failure		1 (9.09)		3 (3.53)		0.385
	Mesenteric ischemia		0 (0.00)		1 (1.18)		0.718
	Abdominal compartment syndrome		0 (0.00)		0 (0.00)		
Intrahospitalar mortality			0 (0.00)		0 (0.00)		
30 days mortality			0 (0.00)		0 (0.00)		
1 year mortality			0 (0.00)		5 (5.88)		0.008
Requiring additional procedures within 30 days	Endoleak		1 (9.09)		1 (1.18)		<0.01
	Occlusion of an iliac branch		**1 (9.09)**		0 (0.00)		
Requiring additional procedures at 1 year	Stenosis of an iliac branch				1 (1.18)		<0.01
	Aortic Pseudoaneurysm		0 (0.00)		1 (1.18)		
	Occlusion of an iliac branch		1 (9.09)		0 (0.00)		
	Endoleak		1 (9.09)		1 (1.18)		
Length of hospital stays				13.09 (8.26)		5.46 (3.62)	<0.01
Duration of ICU admission				2.36 (1.12)		1.76 (1.65)	0.242

AAA – Abdominal aortic aneurysm; ICU – intensive care unit

LIMITATIONS

This study has several limitations. First, its retrospective and observational design precludes causal inference and introduces potential biases, including selection bias, as only patients treated at our center were included, yielding a convenience sample. Second, the number of patients with giant AAAs was relatively small, which limits statistical power and generalizability. Third, reliance on historical medical records may have introduced information bias, as some clinical or anatomical data may not have been consistently documented.

In addition, the number of ruptured cases was low, reflecting both the rarity of giant AAAs and the limited incidence of rupture. Importantly, our dataset included only patients who survived to undergo surgical intervention. Patients who died before reaching the operating room were not captured, likely underestimating the true number of ruptured cases.

CONCLUSION

Giant abdominal AAAs are a rare and complex clinical condition that disproportionately affects older male patients and carries a markedly higher risk of rupture compared with non-giant AAAs. This reaffirms aneurysm diameter as the most critical predictor of rupture risk. Despite their advanced size, many giant AAAs remain asymptomatic until rupture, underscoring the need for early diagnosis and vigilant surveillance.

Our findings highlight a clear preference for open repair in giant AAAs, particularly in ruptured cases where emergent intervention is often required. Outcomes were worse in the giant AAA cohort, with higher rates of postoperative complications and reinterventions, especially following rupture.

Future studies with larger cohorts are needed to better define the unique anatomical and clinical features of giant AAAs and to optimize treatment strategies. Advances in endovascular technologies and more tailored approaches may eventually expand the therapeutic options available for this challenging condition.

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