

Scientific Journal of the Faculty of Medicine in Niš 2012;29(3):133-137

Original article ■

Seasonal Variations of the Incidence of Ruptured Abdominal Aortic Aneurysm at the Territory of the South Serbia

Zoran Damnjanović¹, Milan Jovanović^{1,2}, Predrag Đorđević¹, Nenad Ilić¹, Irena Janković^{2,3}, Igor Smiljković¹, Nikola Đorđević¹, Dragutin Grozdanović¹

¹Vascular Surgery Clinic, Clinical Center Niš, Serbia

²University of Niš, Faculty of Medicine, Serbia

³Plastic and Reconstructive Surgery Clinic, Clinical Center Niš, Serbia

SUMMARY

Literature data on the association between the incidence of ruptured abdominal aorta and seasons are contradictory. The influence of climatic factors on the rupture of abdominal aorta is geographically dependent.

The aim of this research was the investigation of the connection between the incidence of ruptured abdominal aorta and seasons at the territory of the southern Serbia.

In this retrospective study, 59 consecutive patients, who were hospitalized in the Vascular Surgery Clinic, Clinical Center Niš, between 2008 and 2011, were involved, having the rupture of the infrarenal segment of the abdominal aorta. The incidence of the ruptured aneurysm of the abdominal aorta was analyzed with regard to calendar years, seasons and months.

There was no significant connection between calendar year (χ^2 test=3,836, $p=0,28$), seasons (χ^2 test=3,4, $p=0,334$) and months (χ^2 test =11,109, $p=0,434$) and the incidence of the disease.

According to the results of this study, it can be concluded that the incidence of ruptured abdominal aortic aneurysm in the southern Serbia is not related to seasons and months during the year.

Key words: seasons, incidence, ruptured abdominal aortic aneurysm

Corresponding author:

Zoran Damnjanović •

phone: +381 600798309 •

e-mail: damnjanovic@yahoo.com •

INTRODUCTION

Literature data on the association between the incidence of ruptured abdominal aorta and seasons are contradictory. The influence of climatic factors on the rupture of abdominal aorta is geographically dependent. Studies carried out in Canada (1) and United Kingdom (2) have shown a higher incidence of rupture during autumn and spring, while studies in England, Wales (3) and Western Australia (4) during winter season. In the southwestern Greece, 78% of all ruptures occur in April and October (5).

Research conducted by Upshur et al. in Canada has shown that the connection between the incidence of ruptured abdominal aorta and seasons does not exist. There is no data on the connection between the incidence of ruptured abdominal aorta and seasons in the southern Serbia.

The aim of this research was to investigate the connection between the incidence of ruptured abdominal aorta and seasons at the territory of the southern Serbia.

PATIENTS AND METHODS

In this retrospective study we included only patients with a rupture of infrarenal segment of abdominal aorta who were hospitalized in the Vascular Surgery Clinic, Clinical center Niš, between 2008 and 2011.

In all patients, the diagnosis was based on anamnesis, clinical presentation, physical examination, laboratory analysis and multislice computed tomography (MSCT). The 53 patients were operated on and 6 patients died during preoperative preparation.

The incidence of ruptured aneurysm of the abdominal aorta was analyzed with regard to calendar years, seasons and months.

RESULTS

The research involved 55 patients, 71,25±8,48 years old. There were 43 men and 12 women, aged 71,46±8,64 and 70,5±8,17, respectively (Table 1).

The connection between calendar year and outbreak of the disease is shown in Figure 1.

There was no significant connection between calendar year and outbreak of the disease (χ^2 test=3,836, p=0,28).

The association between season and outbreak of the disease is shown in Figure 2.

There was no significant connection between season and outbreak of the disease (χ^2 test=3,4, p=0,334).

The connection between months and outbreak of the disease is shown in Figure 3.

There was no significant connection between months and outbreak of the disease (χ^2 test=11,109, p=0,434).

Table 1. Age of patients in relation with with gender

Gender	$\bar{X} \pm SD$
male	71,46±8,64
female	70,5±8,17

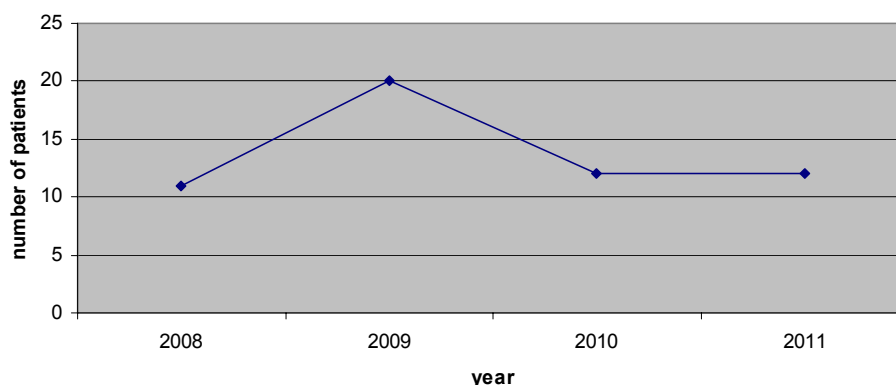


Figure 1. Number of patients in relation with calendar year

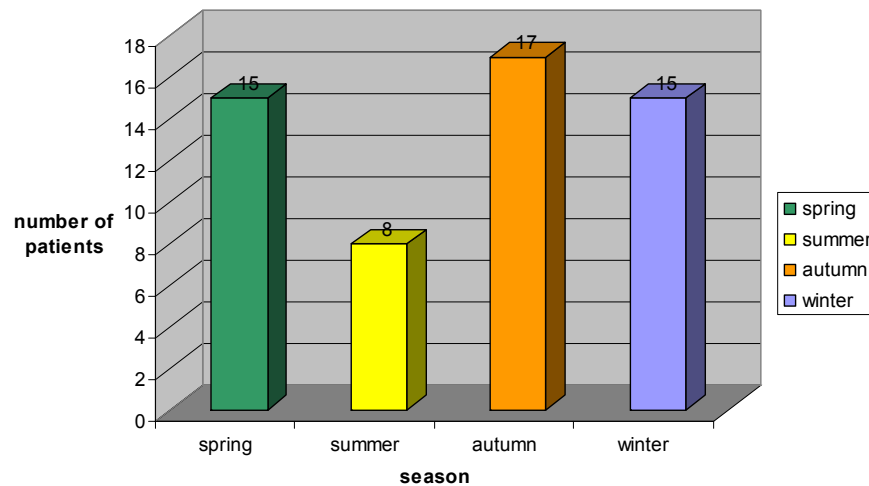


Figure 2. Number of patients in relation with seasons

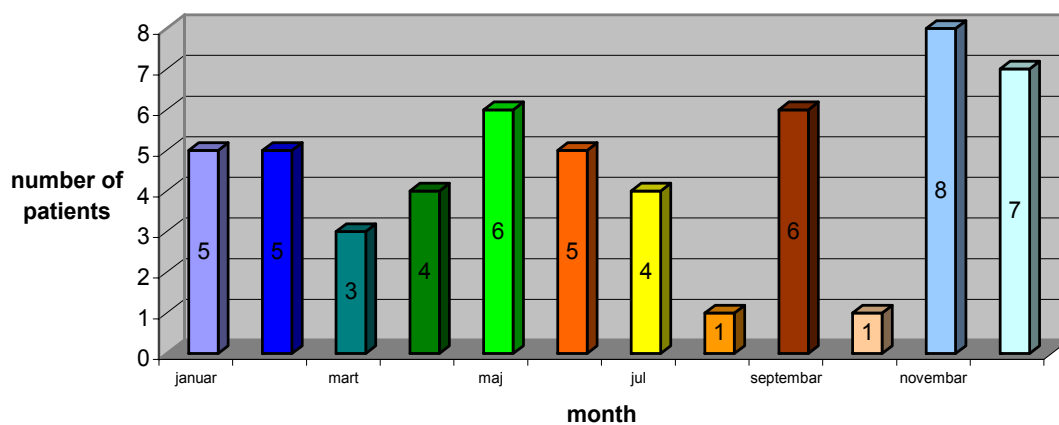


Figure 3. Number of patients in relation with months of the year

STATISTICAL ANALYSIS

The data were analyzed by means of commercially available statistics software package (SPSS® for Windows, v. 9.0, Chicago, USA). To compare nonparametric data, the Chi square test for one sample was performed. To compare parametric data, the Student's t test was performed. The results were presented as means \pm SD. The p value of ≤ 0.05 was considered as significant.

DISCUSSION

Analyzing the data obtained in this study, we were not able to prove the seasonal and monthly dependence of ruptured aneurysm of abdominal aorta, which is in keeping with the results of the study carried out by Upshur et al. (6).

Biological factors which represent the risk factors for ruptured abdominal aneurysm have been defined. Risk dramatically increases in the following circumstances: age above 60 years, smoking, hypertension, low level of HDL cholesterol and Caucasian ethnicity (7). Although the number of elective operations of abdominal aneurysm is in increase, standardized age and gender mortality rate is also increased, especially in males older than 65 years (8).

Pathogenesis of abdominal aneurysm is genetically related. Although the sensitive genes have been described, candidate-based genetic studies failed to prove the cause of genetic mutations (9).

Probability of abdominal aneurysm rupture is related to aneurysm size, speed of its enlargement, smoking and persistent hypertension (7). Mortality risk in patients with ruptured aneurysm increases with age, and

it is higher in women, considering patients younger than 80 years of age (10).

Climate impact was also a subject in this study. However, literature data are rather conflicting. Bown et al. (11) proved the connection between ruptured abdominal aneurysm incidence and low atmosphere pressure. Kurtoglu et al. (12) and Killeen et al. (1) proved the absence of this connection in their studies.

There are data on the connection between ruptured abdominal aneurysm incidence and winter season (2). Low temperature increases sympathetic activity (13), blood pressure (14, 15) and arterial spasm (16) increases the platelet level, number of red blood cells and blood viscosity (16), as well as the lipid blood level (17), which can be contributory factors for the rupture of abdominal aortic aneurysm. During peripheral vasoconstriction, systolic pressure increases more than diastolic which increases the pulse wave, leading to the rupture of abdominal aortic aneurysm. However, there are data (1, 3) showing the outbreak of

rupture of abdominal aortic aneurysm during spring and autumn. Therefore, it cannot be proven that rupture of abdominal aortic aneurysm is connected with low temperature and season of the year.

Despite the data obtained in this study, there is no seasonal and monthly influence on the incidence of the abdominal aortic aneurysm rupture. Diversity of literature data points out the necessity of further research of this problem, as well as consideration of other meteorological factors not examined so far.

The lack of this study is its retrospectiveness, although we have to consider the fact that all data obtained in this study were protocolized prospectively.

CONCLUSION

According to the results of this study, it can be concluded that the incidence of ruptured abdominal aortic aneurysm in the southern Serbia is not related to seasons and months of the year.

References

1. Killeen SD, O'Sullivan MJ, Coffey JC, Redmond HP, Fulton GJ. Are periods of low atmospheric pressure associated with an increased risk of abdominal aortic aneurysm rupture? *Ir J Med Sci* 2008; 177(3): 217-20. <http://dx.doi.org/10.1007/s11845-008-0149-8> PMID:18584276
2. Varty K, Reid A, Jagger C, Bell PR. Vascular emergencies: what's in season? *Cardiovasc Surg* 1995; 3(4): 409-11. [http://dx.doi.org/10.1016/0967-2109\(95\)94160-X](http://dx.doi.org/10.1016/0967-2109(95)94160-X)
3. Ballaro A, Cortina-Borja M, Collin J. A seasonal variation in the incidence of ruptured abdominal aortic aneurysms. *Eur J Vasc Endovasc Surg* 1998; 15(5): 429-31. [http://dx.doi.org/10.1016/S1078-5884\(98\)80205-0](http://dx.doi.org/10.1016/S1078-5884(98)80205-0)
4. Castleden WM, Mercer JC. Abdominal aortic aneurysms in Western Australia: descriptive epidemiology and patterns of rupture. *Br J Surg* 1985; 72(2): 109-12. <http://dx.doi.org/10.1002/bjs.1800720213> PMID:3971115
5. Kakkos SK, Tsolakis JA, Katsafados PG, Androulakis JA. Seasonal variation of the abdominal aortic aneurysm rupture in southwestern Greece. *Int Angiol* 1997; 16(3): 155-7. PMID:9405006
6. Upshur RE, Mamdani MM, Knight K. Are the seasonal patterns to ruptured aortic aneurysms and dissections of the aorta? *Eur J Vasc Endovasc Surg* 2000; 20(2): 173-6. <http://dx.doi.org/10.1053/ejvs.2000.1139> PMID:10942690
7. Aggarwal S, Qamar A, Sharma V, Sharma A. Abdominal aortic aneurysm: A comprehensive review. *Exp Clin Cardiol* 2011; 16(1): 11-5. PMID:21523201 PMCid:3076160
8. Lindholt JS. Abdominal aortic aneurysms. *Dan Med Bull* 2010; 57(12): 4219.
9. Nordon IM, Hinchliffe RJ, Loftus IM, Thompson MM. Pathophysiology and epidemiology of abdominal aortic aneurysms. *Nat Rev Cardiol* 2011; 8(2): 92-102. <http://dx.doi.org/10.1038/nrcardio.2010.180> PMID:21079638
10. Schlösser FJ, Vaartjes I, van der Heijden GJ, Moll FL, Verhagen HJ, Muhs BE, et al. Mortality after hospital admission for ruptured abdominal aortic aneurysm. *Ann Vasc Surg* 2010; 24(8): 1125-32. <http://dx.doi.org/10.1016/j.avsg.2010.07.010> PMID:21035705
11. Bown MJ, McCarthy MJ, Bell PR, Sayers RD. Low atmospheric pressure is associated with rupture of abdominal aortic aneurysms. *Eur J Vasc Endovasc Surg* 2003; 25(1): 65-71. <http://dx.doi.org/10.1053/ejvs.2002.1798> PMID:12525814
12. Kurtoglu M, Yanar H, Aksoy M, Ertekin C, Tunca F, Güloğlu R, Tinay I. Seasonality in the incidence of abdominal aortic aneurysm ruptures: a review of eight years. *Ulus Travma Acil Cerrahi Derg* 2004; 10(1): 39-41. PMID:14752685
13. Hata T, Ogihara T, Maruyama A, Mikami H, Nakamaru M, Naka T, et al. The seasonal variation of blood pressure in patients with essential hypertension. *Clin Exp Hypertens* 1982; (3): 341-54. <http://dx.doi.org/10.3109/10641968209060747>

14. Collins KJ. Low indoor temperatures and morbidity in the elderly. *Age Ageing* 1986; 15(4): 212-20.
<http://dx.doi.org/10.1093/ageing/15.4.212>
PMid:3751747
15. Kunes J, Tremblay J, Bellavance F, Hamet P. Influence of environmental temperature on the blood pressure of hypertensive patients in Montreal. *Am J Hypertens* 1991; 4(5): 422-6.
PMid:2069775
16. Keatinge WR, Coleshaw ERK, Easton JC, Cotter F, Mattock M, Chelliah R. Increases in platelet and red cell counts, blood viscosity, and arterial pressure during mild surface cooling: factors in mortality from coronary and cerebral thrombosis in winter. *Br Med J* 1984; 289(6456): 1045-8.
<http://dx.doi.org/10.1136/bmj.289.6456.1405>
PMid:6437575 PMCID:1443679
17. Gordon DJ, Hyde J, Trost DC, Whaley FS, Hannan PJ, Jacobs DR, et al. Cyclic seasonal variation in plasma lipid and lipoprotein levels: the Lipid Research Clinics Coronary Primary Prevention Trial Placebo Group. *J Clin Epidemiol* 1988; 41(7): 679-89.
[http://dx.doi.org/10.1016/0895-4356\(88\)90120-5](http://dx.doi.org/10.1016/0895-4356(88)90120-5)

SEZONSKE VARIJACIJE U INCIDENCI RUPTURE ANEURIZME ABDOMINALNE AORTE NA TERITORIJI JUŽNE SRBIJE

Zoran Damnjanović¹, Milan Jovanović^{1,2}, Predrag Đorđević¹, Nenad Ilić¹, Irena Janković^{2,3}, Igor Smiljković¹, Nikola Đorđević¹, Dragutin Grozdanović¹

¹Klinika za vaskularnu hirurgiju, Klinički centar Niš, Srbija

²Univzitet u Nišu, Medicinski fakultet, Srbija

³Klinika za plastičnu i rekonstruktivnu hirurgiju, Klinički centar Niš, Srbija

Sažetak

Podaci iz literature o povezanosti incidence rupture trbušne aorte sa godišnjim dobima su kontradiktorni. Uticaj klimatskih faktora na pojavu rupture trbušne aorte je geografski zavisian.

Cilj ovog istraživanja bilo je ispitivanje povezanosti incidence rupture aneurizme trbušne aorte sa godišnjim dobima i mesecima u godini na teritoriji Južne Srbije.

U ovom retrospektivnom istraživanju uključeno je 59 uzastopnih bolesnika sa rupturom infrarenalnog segmenta aneurizme abdominalne aorte koji su hospitalizovani u Klinici za vaskularnu hirurgiju Kliničkog centra u Nišu, u periodu od 2008. do 2011. godine. Analizirana je i upoređivana povezanost incidence rupture aneurizme abdominalne aorte sa periodima kalendarskih godina, godišnjim dobima i mesecima.

Nije postojala signifikantna povezanost između kalendarske godine (χ^2 test=3,836, p=0,28), godišnjeg doba (χ^2 test=3,4, p=0,334) i meseca u godini (χ^2 test =11,109, p=0,434) sa pojavom bolesti.

Prema rezultatima ove studije, može se zaključiti da incidenca rupture aneurizme abdominalne aorte na teritoriji Južne Srbije nije povezana sa godišnjim dobima i mesecima u godini.

Ključne reči: godišnja doba, incidenca, ruptura aneurizme abdominalne aorte