Historical Vignette

Constantinos Mermigas (1874-1941): Aneurysms Through the Work of a Pioneer Greek Surgeon

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Abstract

Constantinos Mermigas (1874-1941) was a prominent Greek military surgeon and professor of surgery known for his contributions to both medicine and literature. Alongside multiple medical treatises, Mermigas delved into literature and philosophy, showcasing a diverse intellectual pursuit. This paper specifically centers on Mermigas' examination of aneurysms within his medical work, "General Surgical Pathology", particularly within the chapter on "Idiopathic diseases of the vessels". By juxtaposing his insights with contemporary perspectives, this paper succinctly explores both similarities and differences. Furthermore, it draws significant medical conclusions from Mermigas' analyses, shedding light on the enduring relevance of his contributions. Additionally, conclusions regarding medical ethos and scientific way of work in medicine can be drawn. Aneurysms are a diachronic medical topic that has been addressed since the Hippocratic era.

Keywords: *Vascular Surgery, Aneurysms, 20th century, History of Medicine*

Introduction

Constantinos Mermigas (1874-1941) was a renown Greek surgeon and medical philosopher. He was born in Itilo, Laconia, Greece in 1874 and studied medicine at the University of Athens. In 1896, he joined the Greek army. He served in military hospitals from 1896 to 1900. He also took an active part in the unsuccessful Greco-Turkish war of 1897, where he was recognized for his medical skills. During his serve as military physician he founded the primary First Aid Station in Athens (Louros, 1980). He was later elected as a member of the Greek parliament of Laconia. In the years 1900-1903, he specialized in surgery in Germany and in 1904 he was elected lecturer at the Department of Surgery at the University of Athens. In 1922, he became full professor of Surgery and Topographical Anatomy, and in 1935 full professor at the University's Surgical Clinic. In addition, he wrote extensive and pioneering books on medicine and medical philosophy. He also composed "History of Sciences, from the ancient times till today" (1940). Furthermore, he occupied himself with literature and translated Goethe's "Faust" in Greek. In 1941, during the German occupation of Greece, he worked as the mayor of Athens for three months. He resigned after a short time, realizing that he could not significantly aid the Greeks via his political position. He probably committed suicide in either an active or passive manner (Papyros Larousse Britannica Encyclopedia, 1996) (Drizis, 2016).

Idiopathic diseases of the vessels in general surgical

In 1926 Constantinos Mermigas published the fourth edition of his book "General Surgical Pathology" by Makris PG publication in Athens. He summarizes the

existing knowledge regarding aneurysms in the fourth chapter of the fifth part of the book, entitled "Idiopathic Diseases of the Vessels".

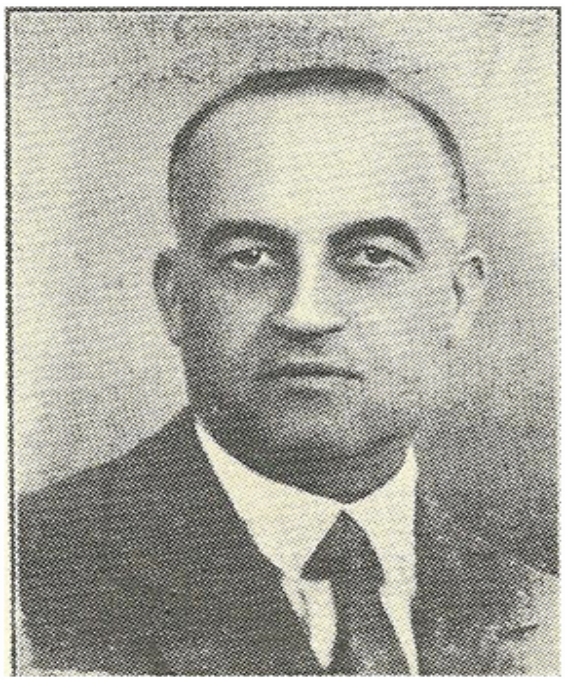


Figure 1. *Constantinos Mermigas (1874-1941)*

He there presents the fundamentals in their etiology, clinical presentation, diagnosis and treatment.

Etiology

According to Mermigas' work, the endurance of the arterial wall can be decreased by degenerative destruction of the elastic fibers, atherosclerotic decay of the wall and epigenetic scar tissue, infectious fusion of the internal vascular tunic, etc. These causes lead to the arterial wall's inability to balance the pressure that is exercised by the circulating blood. Therefore, the arterial wall may collapse and an aneurysm may be developed. This decrease of the arterial wall's endurance can be macroscopically caused by lesion, acute inflammation, syphilis, embolism, arteriosclerosis, physical struggle or strong mental stimulation (combined with a pre-existing disease). The aneurysmatic dilation can be categorized based on its shape in: "even" (cylindrical), "fusiform", or "saccular". After the rupture, the blood may sometimes be dispersed between the layers of the arterial wall and separate them. These types of dilations belong in the group of "genuine" aneurysms. That is because the aneurysmatic wall is comprised of the dilated and deteriorated by the primary disease arterial wall. "Fake" aneurysms are developed due to the rupture of an artery, after which the blood flows out but remains near the ruptured area. They are characterized as "fake", because they are not in reality aneurysms, but hematomas. Finally, the "arteriovenous" aneurysm is mainly caused by a trauma on adjacent arteries and veins (and rarely because of another etiology). The direct interaction between the arterial and the venous blood and the fusion of their walls propel the arterial blood into the vein due to its higher pressure. An aneurysmatic varicose is then developed.

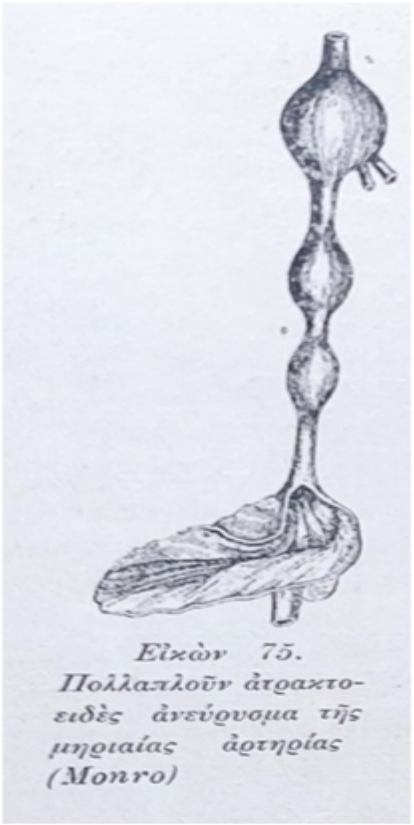
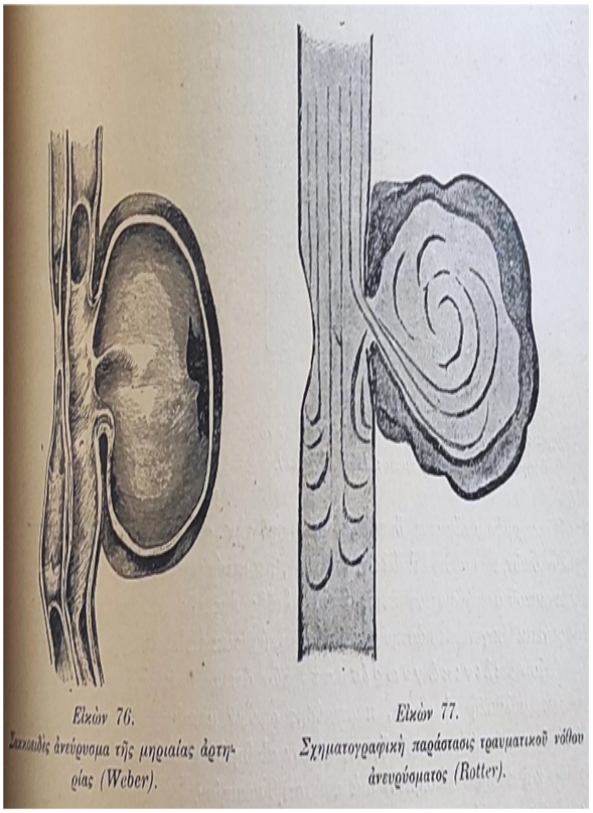


Figure 2: *Multiple fusiform aneurysms of the femoral artery*

Today, the factors that Mermigas identified as causing aneurysms have been thoroughly validated. Currently, when aneurysms are classified based on their etiological factors, they fall into one of three categories: degenerative, inflammatory, or hereditary. Also, research on the microbiome and heredity has since progressed rapidly (Mehrabi Nasab & Athari, 2022) (Isselbacher & Lino Cardenas & Lindsay, 2016) (Roux et al., 2014). Interestingly, the terminology that Mermigas used to describe the shape of aneurysms still holds true and remains crucial in determining whether an aneurysm should be treated surgically (Nathan et al., 2011) (Natsume et al., 2017). It is remarkable, that despite the lack of imaging techniques in the past, physicians were still able to accurately describe and treat these pathological phenomena.

Clinical characteristics

Regarding the clinical characteristics of an aneurysm, Mermigas underlines that they are specific. An aneurysm constitutes a soft, unresisting dilation, which additionally crates pulse. Its pulse is transmitted to each route of the swelling this is developed. Thrill is likewise observable within the palpated side. Moreover, murmur can be detected with the use of stethoscope (extra regularly for the duration of the systolic section). When implemented strain upon, the swelling disappears and appears once more afterwards. Furthermore, the heartbeat of the arterial brunch peripherally of the aneurysmatic artery is weaker and detected more slowly than on the unaffected a part of the body. Finally, implemented strain on an arterial component between the aneurysm and the heart pauses the heartbeat, the thrill, and the murmur of the swelling. On the other hand, when pressure is applied peripherally of the aneurysm, it induces a raise of the strain of the aneurysmatic dilation.


Εἰκὼν 76.
Σακκώδης ἀνεύρυσμα τῆς μηριαίας ἀρτηρίας (Weber).

Εἰκὼν 77.
Σχηματογραφικὴ παράστασις τραυματικοῦ κόλπου ἀνευρύσματος (Rotter).

***Figure 3**: a) Saccular aneurysm of the femoral artery, b) Traumatic fake aneurysm*

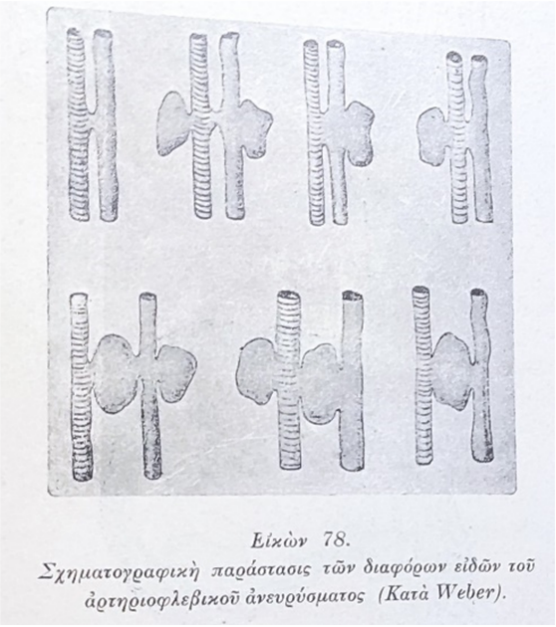
Diagnosis

In order to provide a valid aneurysm's diagnosis, its type should be additionally verified. This may be accomplished via the identification of its underlying etiology, in compliance with the interpretation of its particular symptoms, especially those regarding with the "arteriovenous" aneurysm. This type of aneurysm is diagnosed due to its differentiating traits. Firstly, its murmur is non-stop (systolic and diastolic), in comparison with the arterial one, in which it is only present during the systolic phase. This continuity is an end result of the non-stop blood flow, even at the duration of the dilation, due to the massive strain difference between the artery and the vein. Secondly, due to the obstruction of the venous blood flow, passive hyperemia is developed. This might additionally cause cyanosis, edema or gangrene.

Mermigas indicates that a physician can only distinguish with certainty those three types of aneurysms. He claims that: "whilst considering about some other details, in fact we are only guessing". He additionally provides that one's guesses cannot offer the physician with any practical information. An aneurysm could be misdiagnosed when developed in a great depth, because it is only manifested via oblique symptoms. Moreover, even when it is located superficially, it could be confused with a heat or bloodless abscess or a neoplasm. An aneurysm is capable of causing a plethora of problems. Due to the strain it is able to apply on nerves, it could induce a deficit in motion or sensibility or even trigger neuralgia.

Furthermore, Mermigas suggests, that the compression of a vessel, due to the aneurysm, could result in venous blood stasis and edema or thrombosis. It can also set off bony problems, because of the non-stop bone percussion the arterial wave produces. If the aneurysm is ruptured, it allows blood to exit the vessel, which might also be fatal, depending on the vessel it has occurred. Finally, automatic restoration of the vessel can rarely occur, via thrombosis and epigenetic blockage of the aneurysmatic area. Aneurysms occur, according to Mermigas, mostly in men of middle age (which is today verified) and within the thoracic aorta, popliteal, femoral, carotid, and subclavian artery.

Mermigas, a skilled clinician, developed a comprehensive system for examining aneurysmatic vessels, despite lacking access to advanced imaging techniques, like MRI, CT angiography, and ultrasounds (Liu & Huang, 2018). He recognized the limitations of medicine at the time and acknowledged that the diagnoses were often uncertain. It is important for every physician today to remember his thoughtful approach and avoid over-reliance on medical advances, that are not infallible. Physicians must remain vigilant and cognizant of the limitations of science.



Εἰκὼν 78.
Σχηματογραφικὴ παράστασις τῶν διαφόρων εἰδῶν τοῦ ἀρτηριοφλεβικοῦ ἀνευρύσματος (Κατὰ Weber).

Figure 4. *Various forms of arteriovenous aneurysms*

Treatment

Mermigas recommended that caution is the most important factor in treating aneurysms. According to him, it consists of avoiding and diminishing their etiologies, such as intense mental stimulation, physical struggle and atherosclerosis. It also includes the immediate surgical treatment of any vascular trauma. The primary treatment should be surgery, because: "only the mechanical ablation can safely remove the aneurysm." It was shown at the time that the most effective surgical method was to completely remove the swelling of the aneurysm by ligating every vessel that provided or drained blood from it. Regarding this technique, however, there was a significant risk of disrupting of important vascular pathways, as well as a higher risk of causing dysfunction on the aneurysmal side of the body.

He, therefore, mentions that new, safer methods to overcome the danger have

been studied. It has been shown, according to Mermigas, that the best surgical technique is to suture the arterial or venous trauma, or to restore blood flow after suturing two arterial incisions that develop after the aneurysm's removal. In case the distance is too great to be sutured, a part of the blood vessel must be grafted from another part of the patient's body. However, Mermigas described this approach as challenging and risky. Therefore, it was strongly suggested, that prior to eradication for any cause, pressure should be regularly applied (in distinct hours, for days, or weeks) on the artery. In some cases, it would eventually lead to the formation of a collateral circulation that supplies blood to the body part, in which the aneurysmatic vessel was located. The development of a secure ring of collateral circulation takes about 6-8 weeks for to develop. Therefore, the patient should not undergo surgery immediately after the aneurysm's discovery. It must be noted that any other approach that does not involve the extraction of the aneurysm has been proven to be insufficient to achieve the proper treatment.

If the surgeon couldn't remove it completely, three other methods recommended. The first method involved suturing the blood vessel around the aneurysm to create a thrombus that would block it. Another effective treatment was systemic decompression, which involved applying pressure to the anterior arterial portion of the aneurysm, cutting off or even blocking circulation so that the blood inside the aneurysm could clot. Lastly, a coagulant solution could be injected subcutaneously, making it easier to achieve blood coagulation in the area of the aneurysm. Mermigas noted that the direct injection of any chemical into an aneurysm was prohibited as unsafe. In current times, the field of aneurysm treatment has undergone rapid advancement and the open surgical approach is no longer considered the preferred technique. The endovascular repair approach has emerged instead as the gold standard treatment (Sato & Arita, 2021) (Ultee et al., 2017) (Settembrini et al., 2012). While this approach was first exercised by Volodos half a century ago, it has yet to completely overcome all its challenges, which include infections, endoleaks, and relapses (Hellgren et al., 2017) (Daye & Walker, 2018) (Synowiek et al., 2013) (Rawala et al., 2018).

Conclusions

Regarding the timeless topic of aneurysms, it's noteworthy that the terminology used today was established centuries ago, highlighting the enduring connection between ancient and modern physicians. The ancient physicians relied on physical examination, compensating for their lack of imaging technology, a tradition upheld and enriched by physicians of the 20th century. It's crucial in our medical age not to let these practical qualities diminish due to advances in medical technology. Modern physicians must not neglect their clinical skills and become solely reliant on new techniques.

While medicine has advanced rapidly in recent years, with current knowledge and applications seemingly otherworldly compared to a century ago, it's essential to remember the pioneers who paved the way. They contributed to improving living conditions and overcoming the barriers posed by diseases. The history of medicine highlights historic physicians who can serve as role models and inspiration for current and future generations. It provides moral standards crucial in this technologically dominated era. This alone should motivate individuals to explore its deepest paths.

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