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Importance of anatomopathological analysis and histopathological examination for the diagnosis of suspected cases of syphilitic aneurysm

Importância da análise anatomopatológica e histopatológica para o diagnóstico de casos suspeitos de aneurisma sifilítico

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Abstract
Introduction*: syphilis is a sexually transmitted disease caused by mycobacterium Treponema pallidum in which in its tertiary stage can lead to an aortic syphilitic aneurysm. Currently, such cases are rare because of the effectiveness of antibiotic therapy.* ***Objective****: we aimed to carry out an anatomopathological analysis and histopathological examination of three cases potentially suspicious of aortic syphilitic aneurysm on human corpses. Methods: It was a descriptive study which 03 anatomic specimens of aortas from cadavers with ages ranging from 50 to 91 years obtained in Service checklist of deaths during the period from 2014 to 2015. We performed an anatomopathological and histopathological analysis with the use of special dyes.* ***Results****: through the macroscopic evaluation it was observed in all cases a dilation corresponding to arch of aorta where the intima obtained an aspect of longitudinal striation, classic of syphilitic process. As for histopathological study on the tissues treatment with the staining batteries, it was demonstrated the presence of the dissecting hematoma in all cases, besides necrosis and absence characteristic of the inflammatory process.* ***Conclusion****: the anatomopathological and histopathological study are diagnostic tools which have specific characteristics and are directed to assist in preliminary diagnosis of suspected cases of aortic syphilitic aneurysm in necropsies.*
Keywords*: Aorta. Aortic Aneurysm. cardiovascular syphilis.*

Resumo*:*
Introdução*: a sífilis é uma doença sexualmente transmissível causada pela micobactéria Treponema pallidum em que, em seu estágio terciário, pode levar à um aneurisma aórtico sifilítico. Atualmente, esses casos são raros devido à eficácia da terapia com antibióticos.* **Objetivo***: objetivou-se realizar uma análise anatomopatológica e exame histopatológico de três casos potencialmente suspeitos de aneurisma sifilítico aórtico em cadáveres humanos. Métodos: Estudo descritivo que avaliou 03 amostras anatômicas de aortas oriundas de cadáveres com idades variando de 50 a 91 anos, obtidas no Verificação de Serviço de óbitos no período de 2014 a 2015. Realizamos uma análise anatomopatológica e histopatológica com o uso de corantes especiais.* **Resultados***: através da avaliação macroscópica observou-se em todos os casos uma dilatação correspondente ao arco de aorta onde a íntima obteve um aspecto de estriado longitudinal, clássico do processo sifilítico. Quanto ao estudo histopatológico dos tecidos tratados com as baterias de coloração, foi demonstrada a presença do hematoma dissecante em todos os casos, além da necrose e ausência característica do processo inflamatório.* **Conclusão***: o estudo anatomopatológico e histopatológico são ferramentas diagnósticas com características específicas e orientadas a auxiliar no diagnóstico preliminar de casos suspeitos de aneurisma sifilítico aórtico em necropsias.*
Palavras-chave: *Aorta. Aneurisma Aórtico. Sífilis Cardiovascular.*

INTRODUCTION

Syphilis is a sexually transmitted disease caused by the bacteria Treponema pallidum If not treated, it can determine dermatological, neurological and cardiovascular manifestations[1]. Among the cardiovascular lesions, the syphilitic aortic aneurism is present in tertiary stage of syphilitic infection, being responsible for 5 to 10% of the causes of death of cardiovascular origin, becoming rare today after the advent of penicillin.[1,2] The cardiovascular impairment occurs in approximately 10% of patients with untreated syphilis, which can manifest itself in a period from 5 to 40 years after the initial infection, being the ascending aorta and the descending segment affected approximately 50% and 15% of the cases, respectively. [1]

The main cardiovascular manifestations of the tertiary syphilis include, dilation of the aortic root, aneurysm

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formation, aortic insufficiency and ostial stenosis disease. In previous studies, the coronary ostial lesions were detected in 26% of patients with syphilitic aortitis. [3] The aortitis, an inflammatory response to the invasion of aortic wall by spirochetes, entails obliterating endarteritis of the vasa vasorum and results in necrosis of elastic fibers and connective tissue in the middle layer of the aorta artery. As a consequence of the aorta wall weakening, there may be progression for late vascular syphilis manifestations. [4]

In addition to the macroscopic study of anatomical pieces, several techniques are required in the laboratory of Pathology Anatomy, such as the use of special stainings batteries that aim at a more accurate assessment of specific and rare alterations which affect the aorta, such as syphilitic aneurysms. [5,6]

METHODOLOGY

Place of experiment and Ethical Aspects

All tissue samples were only obtained after the consent of the responsible-legal by the corpse through the signing of the informed consent form (ICF). On the whole (n=3) corpses were necropsied from the Deaths Verification Office, organ of the Department of Health from the State of Pernambuco, located in the Department of Pathology from the University Federal of Pernambuco-UFPE, during the year 2014 to 2015. This research has approval from the Research Ethics Committee from the University Federal of Pernambuco, being approved under letter no. 133/2010.

Aortas Processing

After collection, the anatomical pieces were soaked in buffered formalin at 10%, in a final volume with approximately 20 times the volume of the material until the moment of histological processing in a period not inferior than 72 hours. In parallel, the detailed anatomopathological analysis was performed. In parallel, the intensity of atherosclerosis in macroscopy was assessed according to classification in mild, moderate or severe. The aortas were evaluated with the aid of a standardized scale from 0.0 to 12.0 cm, being considered mild from 0.1 to 4.0 cm, moderate to 4.1 to 7.0 cm and severe from 7.1 to 12.0 cm. The extension of atheromatous plaques was used as a reference for scoring the degree of involvement of the aortas studied. [7]

Histochemical study

After the correct setting of tissue in 10% formalin, histological sections (4 µm) were obtained through horizontal microtome Yamato (Japan) and then mounted on histological slides previously identified, where they were subjected to staining batteries of Hematoxylin and eosin (HE) for histopathological general analysis, Masson trichrome (TM), for analysis of elastic and collagen fibers,, in addition to the Periodic acid–Schiff (PAS), with the purpose to analyze the distribution of glycosaminoglycan, in one of the events. [8]

Histopathological analysis

The histopathological analysis of the tissues stained was made by selecting 10 fields on each slide, where it was evaluated the inflammatory profile, focal points of necrosis, hemorrhage, attempted repair, distribution of glycosaminoglycan, through the characteristic patterns of each dye that has been used in the procedure. The registration of images was performed through a system of capture with a camcorder camera connected to a microcomputer and in turn to an optical microscope.

CASE REPORT

First Case

Male cadaver, 80 years old, married, retired, dark-skinned and low educational level with a history of arterial hypertension and cardiopathy, six months had been presenting strong dyspnea, weight loss, weakness, cough, expectoration, constipation, localized pain in the legs and chest, and hemoptysis a day prior to death.

The macroscopical analysis of aortic artery showed a moderate atheromatous impairment, with presence of saccular aneurysm in the thoracic wall next to the arch where it is observed the presence of mural thrombus with longitudinal striation in the thoracic segment of the intima, as well as, cardiac alterations presented by ring aortic valve dilation and of the cardiac chambers. It was evident hematic crust in the middle layer in the thoracic segment and a collapse of the adventitia next to the implantation of the left ventricle leading the hemopericardium (Figures 1, 2 and 3).

Figure 1 – *Moderate Ateromatous Impairment*

Source: Author

Figure 2 – *Presence of Wall Thrombus*

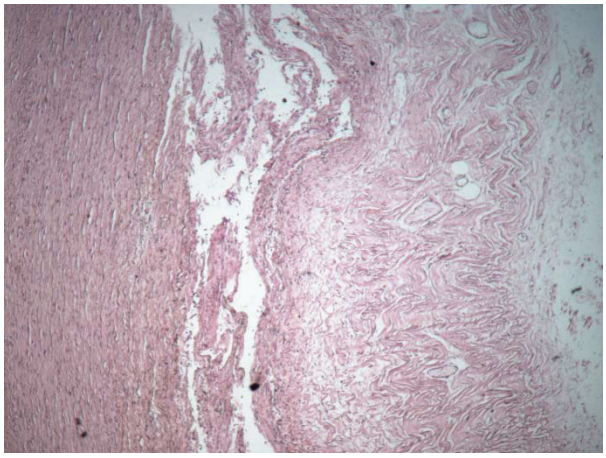
Source: Author

Figure 3 – *Dissection and Hematology Collectio*[n]

Source: Author

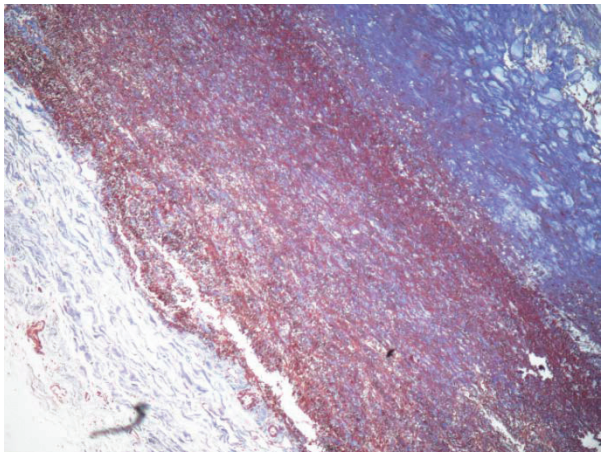
A histopathological study was conducted by means of hematoxylin eosin (HE) and Masson trichrome (TM). Through HE staining, we observed an area of dissection, i.e., a separation of the intima and adventitia with hematoma formation in the medial layer of the vessel, was evident. The necrosis was present, however, it was not evidenced an inflammatory process. Whereas through the TM staining it was not observed in this case changes in the arrangement of collagen fibers and elastin (Figures 4 and 5).

Figure 4 – *Syphilitic Aneurysm (H.E) 4x*



Source: Author

Figure 5 – *Syphilitic Aneurysm (T.M) 4x*



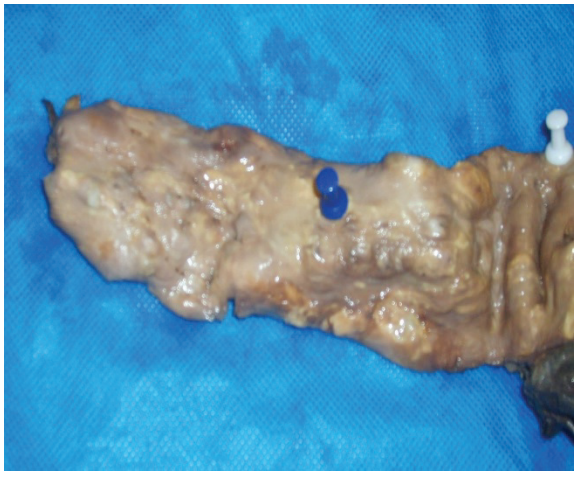
Source: Author

Second case

Female cadaver, 50 years old, married, dark-skinned and low educational level, with a history of diabetes, hypertension and smoking, moments before the death was rescued with numbness in her legs, cough and pain. Through the macroscopic analysis of aorta, it was evidenced moderate atheromatous impairment, in addition to dissecting hematoma extending from the proximal segment until the abdominal aorta. It was also observed a

dilation corresponding to the arch of the aorta where the intima acquired aspect of longitudinal striation, in addition to collapse of the adventitia near the area of implantation of the left ventricle resulting in hemopericardium (Figures 6, 7 and 8).

Figure 6 – *Intense Ateromatous Commitment*



Source: Author r

Figure 7 – *Thrombosis Mural*

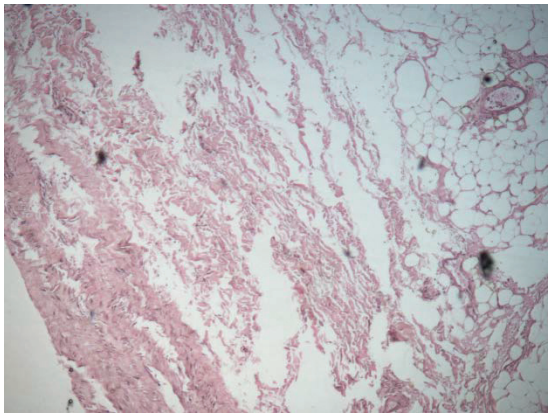
Source: Autho

Figure 8 – *Dissecting Hematoma*

Source: Author

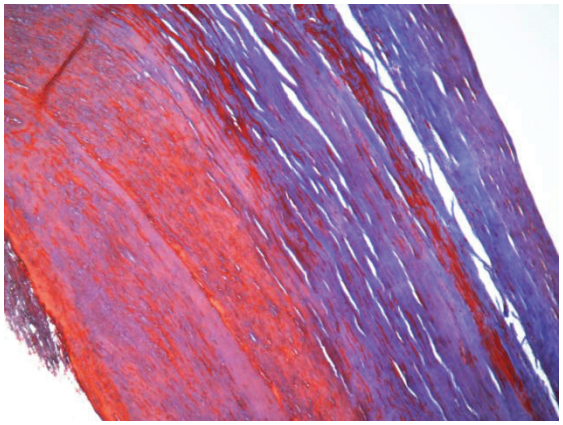
For this case, the histopathological analysis was conducted with the HE, TM and PAS stainings, in which it was demonstrated dissection between the intima and adventitia of the aorta, with formation of a hematoma in the media layer of the artery. The necrosis was present in every segment, besides the absence of inflammatory process. Through the TM staining it was evidenced an intense disorganization of the collagen, in spiral of anomalous conformation. Upon the PAS (periodic acid – Schiff-) staining, it was not evidenced a significant change in the amount of glycosaminoglycan (Figures 9 and 10).

Figure 9 – *Syphilitic Aneurysm (H.E) 4x*



Source: Author

Figure 10 – *Syphilitic Aneurysm (T.M) 4x*



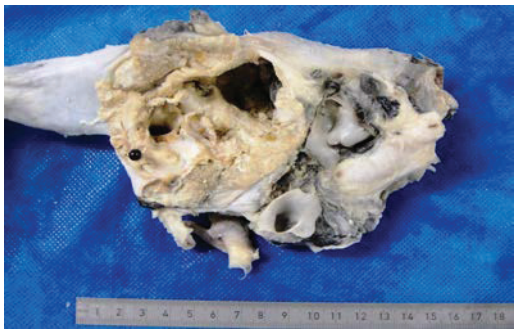
Source: Author

Third case

Male cadaver, 91 years old, married, white, without educational level, with a history of hypertension, Smoking, drinking, loss of weight, cough and expectoration. Two weeks before death he had flu, cough and made use of antihypertensive drugs. At the macroscopic examination the aorta was intensely impaired by atheromatous process, and additionally it was perceived a dissecting hematoma involving its thoracic segment beyond an aneurismatic

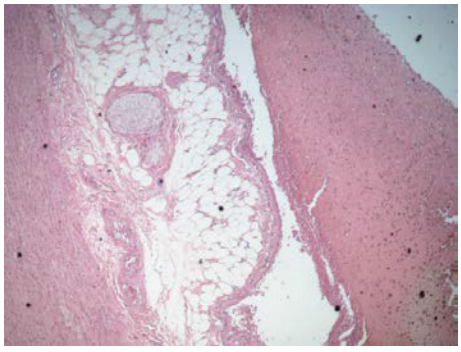
dilation with mural thrombosis superimposed on the segment of the arch (Figure 11 and 12).

Figure 11 – *Intense Atheromatous Process*



Source: Author

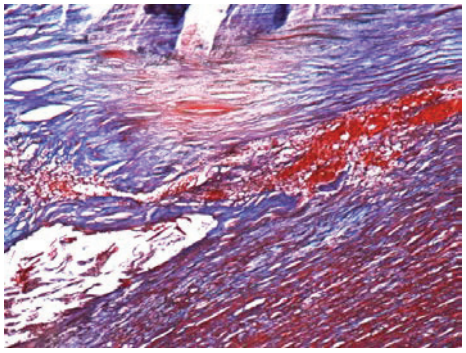
Figure 12 – *Aneurysmal Dilatation*



Source: Author

There was a marked hypertrophy of the left ventricle and a rupture of the adventitia near the area of implantation of the left ventricle that originated the hemopericardium. Through the histopathological analysis, by means of HE (Figure 13) and TM (Figure 14) stainings, it was evidenced dissection between the intima and adventitia, with formation of hematoma in the middle layer of the artery, in addition to necrosis in all its segment and absence of inflammatory process. Still regarding the TM staining it was not observed in the selected segment changes in the arrangement of collagen fibers and elastin.

Figure 13 – *Syphilitic Aneurysm (H.E) 4X*



Source: Author

Figure 14-Syphilitic Aneurysm (T.M) 4X

Source: Author

DISCUSSION

Syphilis is a sexually transmitted disease caused by the bacterium Treponema pallidum, classified in stages I through IV, based on the clinical course and its stage. [10] The syphilitic aneurysm is characterized as a manifestation of tertiary syphilis and currently represents an extremely rare cause of aneurysms of the aorta.[11] Unlike other infectious aneurysms, this type affects the ascendant and thoracic parts, in addition to possessing very specific pathological and histopathological characteristics. Our study corroborates the work published by Roberts[9], in which it was revealed that the syphilitic aneurysm involves the ascendant portion of the aorta in all cases. [9] The mean age in our study was 74 years, and the males preponderant 2:1 in relation to females, a result that is also consistent with data from the literature in which there may be a manifestation in a period from 5 to 40 years after the initial infection. [1]

There are epidemiological reports of a worldwide increase in the absolute number of cases of primary and secondary syphilis in the last decade, coinciding the worsening of the AIDS epidemic, bringing back the need for communitary investigation in the near future.[12] The predilection of spirochetes for small vessels of the vasa vasorum, leads to a chronic inflammation of adventitia particularly involving small arteries and arterioles that perfuse the median layer. [11]

The vasa vasorum undergoes a process of Endarteritis Obliterans, necrosis of the middle layer mesoarteritis, and infiltrate of plasma cells. The elastic tissue is destroyed and replaced by a healing tissue. Such inflammatory process may continue for a long time, and it can be found until 25 years after the initial infection.[13] Rizas[14] ratifies this inflammatory process, indicating that at the site of the injury one of the findings is the lymphoplasmocytic infiltrate. Contrary to reports in the literature, in all three possible cases of syphilitic aneurysm was not demonstrated an inflammatory process

CONCLUSION

In our service of autopsy, we assessed 3 cases potentially suspicious of aortic syphilitic aneurysm. We verified that the characteristics identified in pathological histopathological assessments are important and indispensable in the preliminary diagnosis of syphilitic aneurysm in the routine of necropsies.

REFERENCES

1 – FEITOSA, I. N. de A. et al. Rara apresentação de aneurisma sifilítico roto de aorta com pseudoaneurisma. **Rev. port. cardiol**., Lisboa, v.34, n. 11, p.691.e1–691.e4, 2015.

2 – LI, Wei. Syphilitic aortic aneurysm with a pulmonary lesion: a case report and literature view. **Springerplus**, Switzerland, v. 5, n. 1, 1725 p., 2016.

3 – TEWARI, S.; MOORTHY, N. Cardiovascular syphilis with coronary stenosis and aneurysm**. Indian heart j**., Bombay, v. 66, n. 6, p. 735-736, 2014.

4 – BRAUNWALD, E. (Ed.). et al. **Braunwald tratado de doenças cardiovasculares**. 9. ed. [s.l.;s.n.], 2013. 2 v. p. 1458-1465.

5 – RAMALHO, L. S. **Análise morfométrica de mastócitos na aorta de pacientes autopsiados**. 2010. Dissertação (Mestrado) – Universidade Federal do Triângulo Mineiro, Uberaba, MG, 2010.

6 – TENÓRIO, P. P. **Aspectos anatomopatológicos, ultraestruturais e histoquímicos do aneurisma dissecante da artéria aorta humana**. 2012. 68 f. Dissertação (Mestrado) – Universidade Federal de Pernambuco, Recife, 2012.

7 – FERRAZ, M. L. da F. **Avaliação morfológica da aterosclerose em aortas de pacientes autopsiado.** 2008. 102 f. Tese (Doutorado) – Universidade Federal do Triângulo Mineiro, Minas Gerais, 2008.

8 – CLARK, G. **Staining procedures, Williams & Wilkins**. Baltimore, 1981.

9 – ROBERTS, W. C. et al. Syphilis as a cause of thoracic aortic aneurysm. **Am. J. Cardiol.**, New York, v.116, n. 8, p. 1298-1303, 2015.

10-BUCHACZ, K. et al. HIV incidence among men diagnosed with early syphilis in Atlanta, San Francisco, and Los Angels, 2004 to 2005. **J. Acquir. Immune Defic. Syndr**., Hagerstown, v. 47, n. 2, p. 234-240, 2008.

11-STONE, J. R. et al. Consensus statement on surgical pathology of the aorta from the society for cardiovascular pathology and the association for European cardiovascular pathology: I. inflammatory diseases. **Cardiovasc. pathol**., New York, Sept./Oct. v. 24, n. 5, p. 267-278, 2015.

12 – YASUDA, S. et al. Stent-graft implantation for clinically diagnosed syphilitic aortic aneurysm in an hiv-infected patient. **Ann. thorac. cardiovasc. surg**.,Tokyo, p. 862-866, 2014

13 – SARAIVA, R. S.. ALBERNAZ CÉSAR, C.; MELLO, M. A. A. de. Aortite sifilítica: diagnóstico e tratamento. Relato de caso. **Rev. bras. cir. cardiovasc**., São Paulo, v. 25, n.3, p. 415-418, 2010.

14 – RIZAS, K. D.; IPPAGUNTA, N.; TILSON, M.D. Immune cells and molecular mediators in the pathogenesis of the abdominal aortic aneurysm. **Cardiol. rev**., Hagerstown, v.17, n. 5, p. 201-210, 2009.

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