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Review

Bovine aortic arch: Cases report

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A bovine aortic arch is the most common variant of aortic arch branching in humans with a frequency ranging from 15 to 27% (1-2). It will be considered as a risk factor for aortopathy as anevrysm and dissection. Two cases were reported with association of bovine aortic arch and aortopathy. In both cases, the discovery of the anomaly of the aortic arch was fortuitous. A bovine aortic arch is frequent in patients with thoracic aortic disease than in the general population with a rapid evolution on the diameter of the aorta which expose patients to more complications such as anevrysm, rupture and dissection. It will be considered as a risk factor for aortopaty.

Key words: Bovine aortic arch, aortopathy, common birth aortic arch.

INTRODUCTION

The aortic arch and its branches develop in a complex process during the first 3e4 weeks of fetal life. The supra-aortic trunks for brachiocephalic origin are born separately from the aortic arch. In cattle, the three branches for brachiocephalic origin are from a single trunk. This anatomical variant is called bovine aorta. The common birth of the brachiocephalic arterial trunk (TABC) with the left primary carotid of a single trunk (type 1) or of the left primary carotid from TABC (type 2) is the two forms encountered in humans called by mistake "Bovine aorta" (Layton et al., 2006). The discovery of this congenital malformation is always fortuitous during a CT angiography for aorthopathy (aneurysm or dissection); such is the case in two of the patients. It is true that this anomaly has no particular or serious clinical impact, but can modify the surgical strategy during hybrid surgery or during selective cerebral perfusion.

The frequency of TBSC in patients operated for aortic pathologies (aneurysm and aortic dissection) appears to be higher in the general population. More studies have recently found an association between the presence of bovine aorta (BA) and aortic dilatation (4-5-6). However, not one of them confirmed the increased incidence of aortic dissection in patients with BA. The objective of the study is to report two cases which were discovered incidentally in the radiological diagnosis of aortopathy.

Observation 1

A 45-year-old patient with familial ATCD was operated on for ascending aortic aneurysm. She was admitted For surgical management of massive aortic insufficiency with ascending aortic aneurysm and aortic arch.

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Figure 1. Arch bovine.

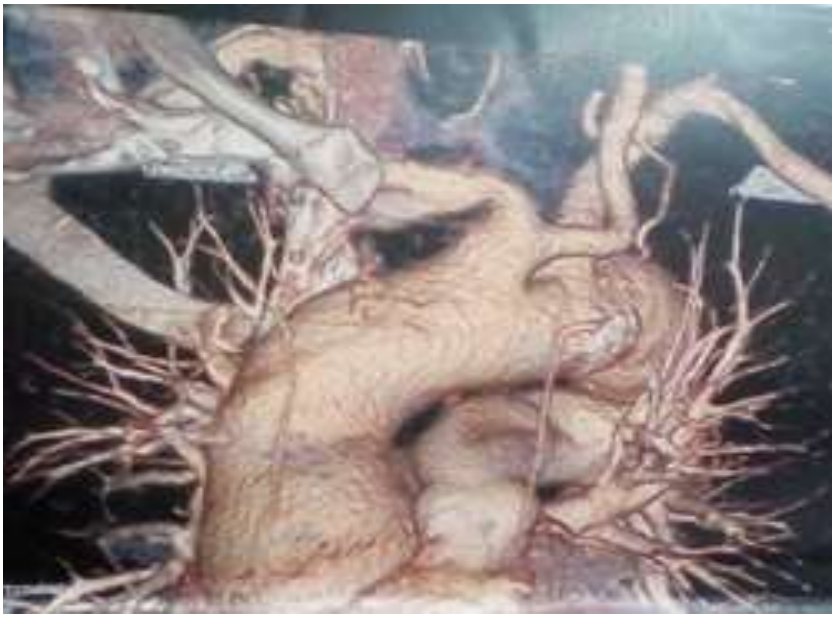

Figure 2. Arch bovine.

CT Scan with three-dimensional reconstruction allowed us to identify common birth of the supra aortic trunks which has been identified as a dilation of the aortic arch (Figures 1 to 2). The patient was operated on for extra corporeal circulation with aortic clamping and crystalloid cardioplegia. She had a replacement of the aortic valve by mechanical prosthesis, number 25, with replacement of the ascending aorta to the foot of the TABC; using a tube in Dacron, number 26. Birth of the brachiocephalic arterial trunk (TABC) with the left primary carotid of a

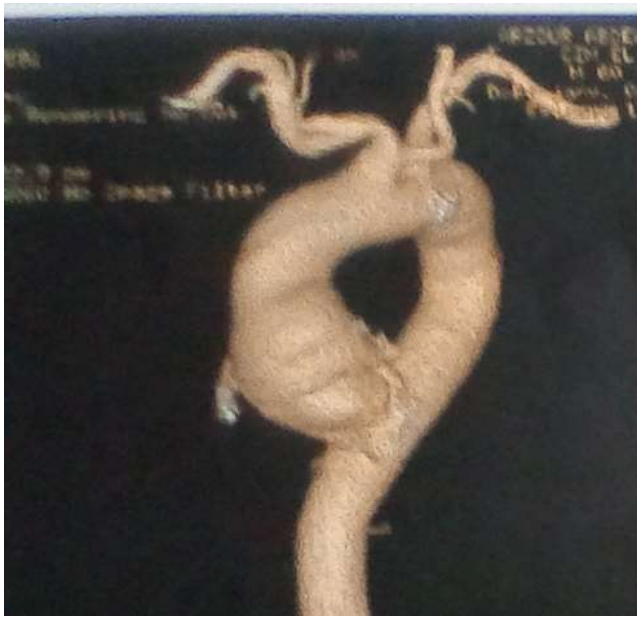

Figure 3. The common birth of the brachiocephalic arterial trunk (TABC) with the left primary carotid of a single trunk.

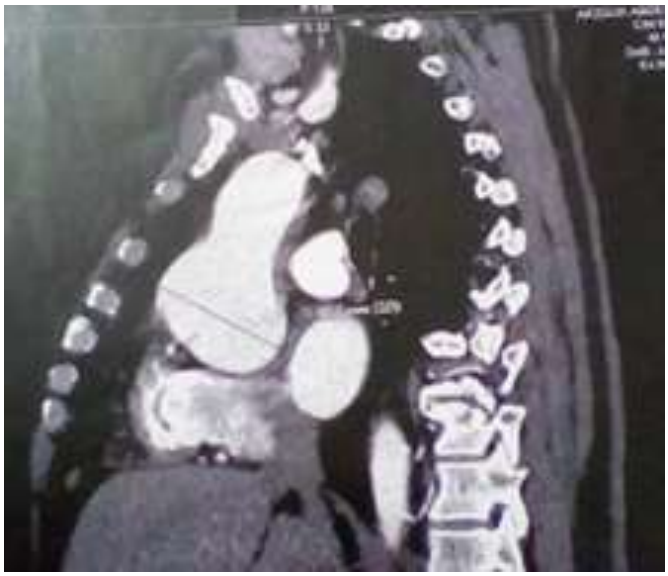

Figure 4. Aortic dissection type A Stanford.

single trunk (Type 1). The post-operative follow-up was simple and the patient was discharged on J10 post-operative.

Observation 2

A hypertensive patient aged 61 under treatment was admitted in the emergency setting for acute dissection of the ascending aorta. CT SCAN showed the common birth of the brachiocephalic arterial trunk (TABC) with the left primary carotid of a single trunk (Figures 3 to 4). The patient was operated on extra corporeal circulation with aortic clamping and crystalloid cardioplegia. He had a replacement of the ascending aorta by a tube in Dacron number 28, with a good post-operative course and he

was discharged at J12 post-operative.

DISCUSSION

The authors found a prevalence of 26.3% of TBSC in patients with an aortopathy against 16.4% in the control group ($p < 0.001$) (Hornick et al., 2012). In addition, they report that the diameter of the ascending aorta progressed faster in subjects with TBSC compared to the general population. Indeed, the progression rate in subjects with bovin aortic arch is 0.29 cm / year compared to 0.09 cm / year in the general population ($p<0.05$). This could suggest a greater elasticity of their aortic wall (Hornick et al., 2012). There are four problems related to this anomaly. First, is that it is necessary to do cerebral perfusion when necessary, to cannulate the TABC alone or to put a second cannula at the level of the right carotid. The second is, in the event of discovery of BA is the diameter of the aotre for which the operative indication is essential in order to prevent a dissection.

Third, when this anomalys is dicovered, a genetic family investigation should be done. The fourth is when this anomaly is discovered, other cardiac and extra cardiac malformations must be searched for. This is because in some cases, bovin aortic arch may be associated with other cardiovascular or extra-cardiac abnormalities. Alghamdi (2009) reported a case of TBSC associated with a double ventricular left ventricle and pulmonary atresia. In other studies, the number of cases with heart abnormalities was too small to establish any correlation between the two. Other studies suggest polymalformative complexes (duodenal atresia, spina bifida).

CONCLUSION

Due to the association of bovin aortic arch and an aneurysmal dilatation of the aorta, it is systematic to carry out a genetic investigation on the one hand and to take charge of this dilatation earlier because the bovine arch may constitute a risk factor of aortopathy with rapid progression exposing to the risk of aortic dissection.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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