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Bako Daouda Inoussa
1. Faculty of Health Sciences, Abdou Moumouni University of Niamey, Niamey, Niger
2. Department of Radiology, Niamey General Reference Hospital, Niamey, Niger

Sani Zakari Mamane Rabiou
1. Faculty of Health Sciences, Abdou Moumouni University of Niamey, Niamey, Niger
2. Department of Surgery and Surgical Specialties at the General Reference Hospital, Niamey, Niger

Guidah Seydou
1. Faculty of Health Sciences, Abdou Moumouni University of Niamey, Niamey, Niger
2. Department of Radiology, Amirou Boubacar Diallo Hospital, Niamey, Niger

Moussa Habou Ibrahim
Department of Radiology, Niamey General Reference Hospital, Niamey, Niger

Oumarou Sidikou Sory
Department of Medicine and Medical Specialties at the General Reference Hospital, Niamey, Niger

Abdou Sadi Cheffou
Department of Radiology, Niamey General Reference Hospital, Niamey, Niger

Corresponding Author:
Bako Daouda Inoussa
1. Faculty of Health Sciences, Abdou Moumouni University of Niamey, Niamey, Niger
2. Department of Radiology, Niamey General Reference Hospital, Niamey, Niger

Scanographic aspects of the origin of supra-aortic trunks at the general reference hospital of Niamey

Bako Daouda Inoussa, Sani Zakari Mamane Rabiou, Guidah Seydou, Moussa Habou Ibrahim, Oumarou Sidikou Sory and Abdou Sadi Cheffou

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Abstract
Objective: Describe the profile of the origin of the supra-aortic trunks at the Niamey general reference hospital.
Material and Methods: Retrospective and prospective study on the anatomical variants of origin of ASD, lasting 18 months from November 1, 2019 to April 30, 2021 in the SRIM of the HGR of Niamey. It was descriptive and analytical and included patients of all ages who had performed a CT examination of the chest with injection of iodinated contrast product. The original anatomical variants of the supra-aortic trunks had been described according to the classification of Natsis *et al*.
Results: the study population was 428 patients. The male gender represented 55.84% (n=239) with an M/F sex ratio of 1.26. The average age of the patients was 51.86±16.68 years with extremes of 4 years and 98 years. The age group >60 years was the most represented with 34.58% (n=148) of patients. The pediatric population represented 0.70% (n=3) of the total population.
Conclusion: Knowledge of anatomical variants is important in order to distinguish them from pathological conditions. More than 20% of the population studied presented an anatomical variant of the origin of the supra-aortic trunks. This is important preliminary data in the field of interventional radiology in our context.

Keywords: Anatomical variant, supra-aortic trunks, computed tomography, Niamey

Introduction
The supra-aortic trunks can be the site of anatomical variations which have been known and described since the first half of the 18th century [1]. They have a common embryological origin which brings together diverse clinical forms. Some are asymptomatic and discovered incidentally, others will cause very severe clinical signs from birth. Knowledge of anatomical variations is important in surgery in order to distinguish them from pathological conditions [2].
Throughout the world, much work has been devoted to the original anatomical variants of ASD. In Niger, little work has been devoted to this subject. It is in this sense that we proposed to make our contribution to the CT study of the origin of the supra-aortic trunks.

Materials and Methods
This is a retrospective and prospective study lasting 18 months from November 1, 2019 to April 30, 2021. The duration of the retrospective study was 13 months and that of the prospective study was 5 months. This study was conducted at the Radiology and Medical Imaging Department of the Niamey General Reference Hospital. It was descriptive and analytical in purpose and included patients of all ages who had undergone CT angiography of the thorax for various indications. A Patients of all ages and genders who had an injected chest CT scan were included in the study. At the end of recruitment, each scan file was reread by a senior radiologist. The variables studied were: age, sex; type the original anatomical variants of the supra-aortic trunks (TSA) found and described according to the Natsis classification [3].

Results: This is a retrospective and prospective study lasting 18 months from November 1, 2019 to April 30, 2021.

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Table 1: classification of anatomical variants of supra aortic trunk according to Natsis *et al*. [3]

Type	Number of branches at the origin	Distribution of branches (from the aortic arch)
I	3	1. The BCAT (brachiocephalic arterial trunk) which is divided into RSCA (right subclavian artery) and RCCA (right common carotid artery) 2. The LCCA (left common carotid artery) 3. The LSCA (left subclavian artery)
II	2	1. The CC-BCAT-LCCA (common trunk between brachiocephalic trunk arteriosus and left common carotid artery) 2. The LSCA (left subclavian artery)
III	4	1. The BCAT (brachiocephalic arterial trunk) 2. The LCCA (left common carotid artery) 3. The LSCA (left subclavian artery) 4. The Left Vertebral Artery
IV	3	1. The RSCA (right subclavian artery) 2. Common Trunk of the RCCA and the LCCA 3. The LSCA (left subclavian artery)
V	3	1. Common trunk of the RCCA and the LCCA 2. The LSCA (left subclavian artery) 3. Retroesophageal RSCA (*arteria lusoria*)
VI	2	Common trunk of the RCCA and the LCCA Common trunk of the LSCA and the RSCA (Bi carotid trunk)
VII	4	1. The RSCA (right subclavian artery) 2. The RCCA (right common carotid artery) 3. The LCCA (left common carotid artery) 4. The LSCA (left subclavian artery)
VIII	4	1. The BCAT (brachiocephalic arterial trunk) 2. The inferior thyroid artery 3. The LCCA (left common carotid artery) 4. The LSCA (left subclavian artery)

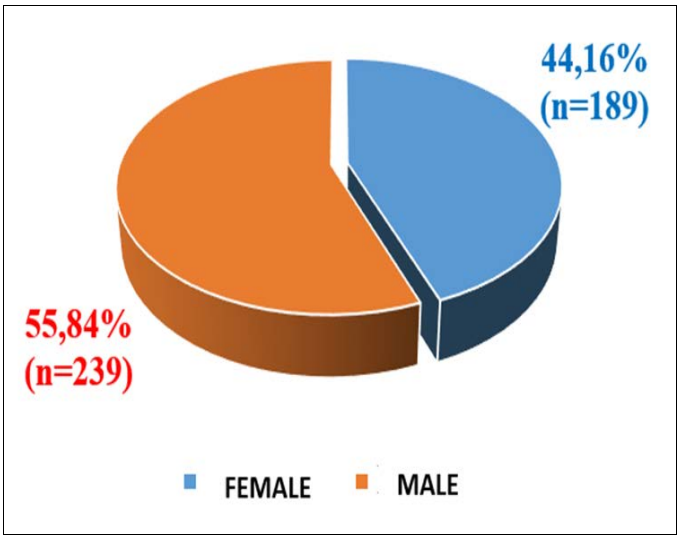

Fig 1: Distribution of patients by gender

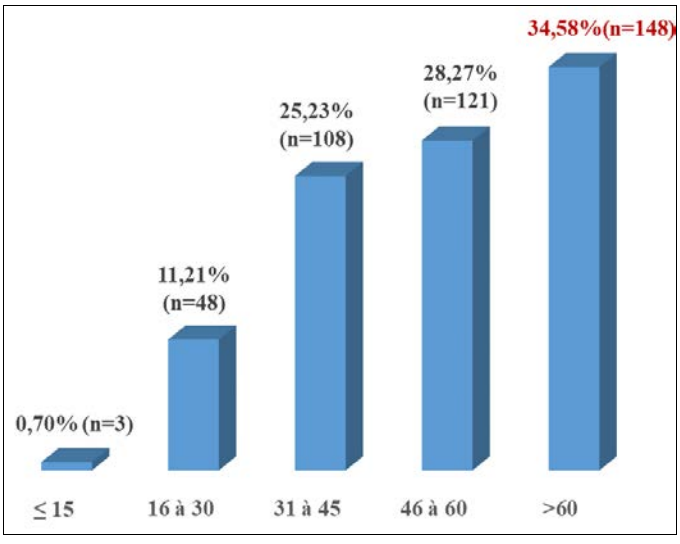

Fig 2: Distribution of patients according to age group.

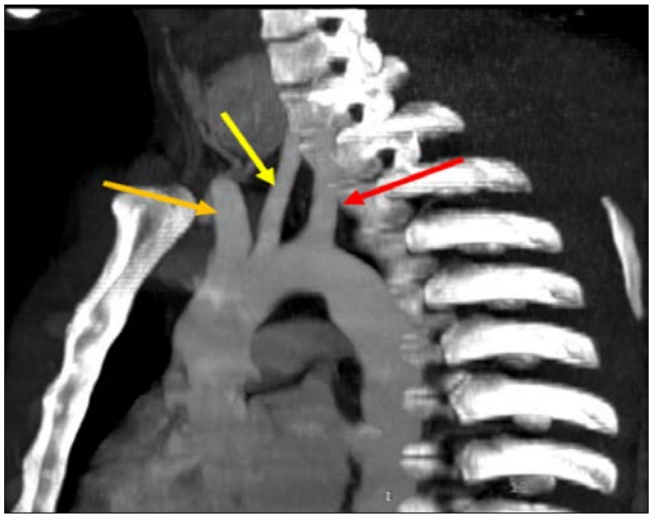

Fig 3: Angio-CT in sagittal section of a standard anatomical configuration of supra-aortic trunk (Type I of the classification by Natsis *et al.*); orange arrow (BCAT); yellow arrow (LCCA); green arrow (LSCA).

Fig 4: CT angio-CT of the thorax in sagittal section (Type II de la classification de Natsis *et al.*); Blu arrow CC-BCAT-LCCA (common trunk between brachiocephalic trunk arteriosus and left common carotid artery); Green arrow LSCA (left subclavian artery).

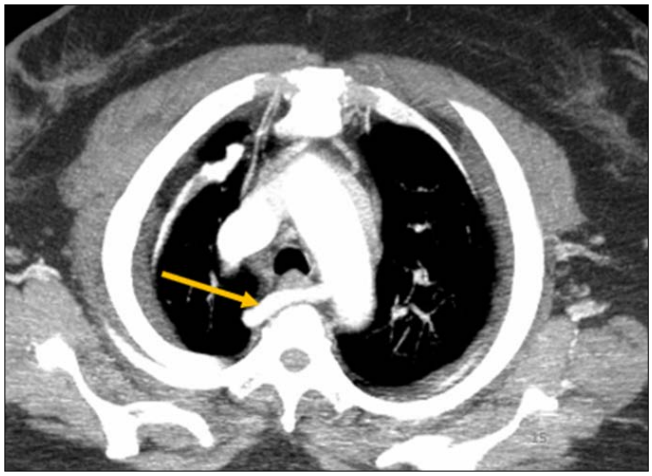

Fig 5: Angio-CT of the thorax in axial section of an arteria lusoria (orange arrow); (Type V de la classification de Natsis *et al.*).

Fig 6: Angio-CT of the thorax in sagittal section of a bicarotid trunk (type VI de la classification de Natsis); yellow arrow (common trunk LCCA and RCCA); green arrow (common trunk LSCA and RSCA).

Discussion

The frequencies of the anatomical variants of origin of supra-aortic trunks are variously evaluated throughout the world [3-7]. This variation can be explained either, by the difference in sampling methods or, by their generally asymptomatic nature, which means that their discovery is most often fortuitous or rarely in the event of symptomatology. A slight male predominance was found in this study and this is in agreement with the data in the literature [4-7].

The classic anatomical arrangement (type I) represents the type most frequently found with 79.67% of boxes. These results are in agreement with data from the literature which reports that it is the most frequent anatomical variant [1-7]. The anatomical variant of type II origin (common origin of the brachiocephalic trunk arteriosus and the left common carotid artery) represents the most frequent anatomical variant of origin of supra-aortic trunks according to the results of this study which is in agreement with other authors such as S. Kouki *et al.* and K. Natsis *et al.* [1, 3] who found this variant in 15 to 20% of individuals. The anatomical variants types III, IV, and VIII were not found in our context [6]. However, K. Natsis found them in 0.79% respectively; 0.16% and 0.16% of cases [3]. Type V was found in 0.23% of cases, making it a rare variant in this study. S. Kouki *et al.* [1] finds it in 1% of anatomical variants of supra-aortic trunks and considers it frequent while K. Natsis *et al.* [1, 3] finds it in 0.16% of cases. Type VI and Type VII were reported in 0.46% of cases each in this study while K. Natsis found them in 0.16% of cases each [3].

Conclusion

The anatomical variants of origin of ASD are quite common in Niger with a predominance of the male sex. Variants other than the classic form seem more frequent in black subjects compared to white subjects. Type II variants; V, VI and VII seem common in black person. Type III variants; IV and VIII seem to be the prerogative of the white person.

Knowledge of anatomical variants is important in surgery in order to distinguish them from pathological conditions and to codify vascular approaches in case of interventional radiology.

Conflict of interest
The authors declared that they have no conflict of interest.

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