

Anomalous Gonadal Arteries in Relation to the Renal Vein: A Preliminary Study in Nigerians

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ABSTRACT

This is a preliminary report of anomalous gonadal arteries in 82 Nigerian cadavers in which the gonadal arteries arched over the renal vein. There were 68 males and 14 females cadavers. Anomalous cases were observed in 34 (52%) of testicular arteries and none in ovarian arteries on the right side; 37 (64%) of testicular arteries and 3 (27%) of ovarian arteries on the left side. Partial occlusion or compression of the renal vein due to the arching gonadal arteries could result in varicocele and hypertension. The knowledge of such anomalous is useful in surgery and human anatomy (*Nig J Surg Res 2000; 2:148-151*)

KEY WORDS: *Gonadal artery, anomalous course, surgical anatomy*

Introduction

The awareness of the variations and anomalous existence of some structures serve as useful aid and guide both in study of human anatomy and in clinical practice. Many of such occurrences have been reported over the years.¹⁻⁵ In particular the incidents of the anomalous course of the gonadal arteries has received much attention.⁴⁻⁶ For instance, cases of the gonadal arteries arching over the pedicles of the renal veins in South Africa Negroid populations has been reported.⁶ This pattern was earlier identified as type III.⁵ This is a preliminary report of anomalous course of gonadal arteries in Nigerian cadavers.

Materials and Methods

The course of the testicular and ovarian arteries was carefully inspected in 82 cadavers comprising of 68 males and 14 females, dissected in the course of student dissection classes in the Department of Human Anatomy,

Ahmadu Bello University, Zaria, from 1991 to 1999.^{7,8} Both the right and left vessels were studied in each cadaver and the observed anomalous cases recorded. To avoid any distortion or damage to the vessels, the students were forewarned and particular attention was given to this region during dissection. However, due to mishandling in a few cases, the vessels could not be studied in all the cadavers. The number of anomalous cases in which the arteries recurved over the pedicles of renal veins were noted and recorded.

Results

Sixty five right and 58 left testicular arteries and 10 right and 11 left ovarian arteries were studied. Anomalous cases observed are shown in table 1.

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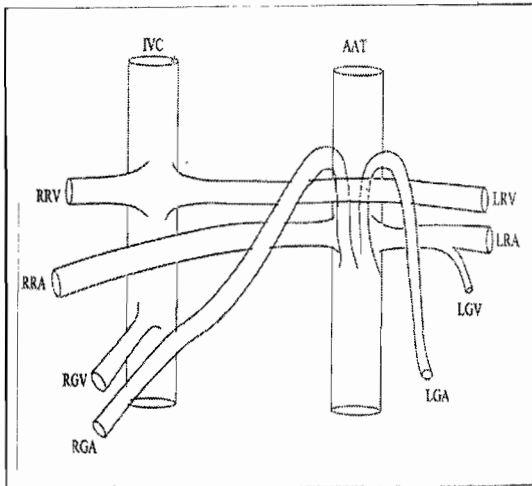
Twenty one (32%) right and 19 (33%) left testicular arteries individually arched on the left renal vein, and in 8 cases, both the right and left arteries were arched on the vein. In 5 cases both the right and left testicular arteries arose as a

single stem from the aorta, while 7 left testicular artery sprung from the left renal artery. Only 3 (27%) left ovarian arteries arched over the left renal vein and no anomalous case was recorded in the right ovarian arteries.

Table 1: Anomalous Patterns Observed in the Gonadal Arteries

	Right Gonadal Artery		Left Gonadal Artery	
	Testicular (n = 65)	Ovarian (n = 10)	Testicular (n = 58)	Ovarian (n = 10)
Type of anomaly	No. (%)	No. (%)	No. (%)	No. (%)
Unilateral anomalous	21 (32)	-	19 (33)	3 (27)
Bilateral anomalous	8 (12)	-	8 (14)	-
Single stem origin from aorta	5 (8)	-	5 (8)	-
Origin from renal artery	-	-	7 (12)	-
Total	34 (52)	-	39 (67)	3 (27)

Figure 1: Diagrammatic Sketch of the Anomalous Gonadal Arteries



(IVC = Inferior Vena Cava; AAT = Abdominal Aorta; RRV = Right Renal Vein; RRA = Right Renal Artery; RGV = Right Gonadal Vein; RGA = Right Gonadal Artery; LRV = Left Renal Vein; LRA = Left Renal Artery; LGV = Left Gonadal Vein; LGA = Left Gonadal Artery)

Discussion

The gonadal arteries embryologically arise from either side of the descending aorta as series of vessels. They soon fuse together and migrate to the ventral surface of the aorta. Their vertical course follows the descent of the gonads,^{9,10} hence the various developmental defects accompanying the gonads could may affect the course of these vessels, and persist till

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adulthood. This is a useful diagnostic point to the developmental biologists and paediatrician.
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In 1955 Notkovich,⁴ dissected 50 cadavers and found anomalous courses in 4% of right and 16% of left testicular artery. No anomalous ovarian arteries were noted in that report. In another report,⁶ there was 75% incidence of anomalous testicular arteries on the right and 7% on the left. Only 2.5% of right ovarian arteries were anomalous and none of left ovarian arteries. The present study reports anomalous course 52% of right testicular artery and of the left testicular arteries, 27% of left ovarian arteries and none of right ovarian arteries. This may indicate a greater occurrence in Nigerian males, but the sample size is small and no definite conclusions can be made. The findings however, like the earlier reports did not indicate any discrepancy of the occurrence on either side. The main type of variant in this report was identified as type III⁵ anomaly in which the gonadal arteries arise from the abdominal aorta, inferior to the traversing left renal vein, recurves upwards, arching over the stem of the renal vein and then courses downward to the testis or ovary (Figure 1). In the South African Negroes⁶, however, observations were mainly cases in which the gonadal arteries arched over the left renal vein. The report is suggestive of apparently higher incidence in Nigerian males, however, further work with more female samples is required to be more conclusive.

The awareness of these anomalous courses is of particular interest in developmental biology and surgical anatomy. Moreover, such anomaly could result in compression of the vessels causing testicular and pelvic varicocele, hypertension, proteinuria and albuminuria.

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References

1. Nathan H, Tobias PV, Welstead MD. An unusual case of right and left testicular arteries arching over the left renal vein. *Br J Urol* 1976; 48: 135-138.
2. Grine FE, Kramer B. Variations in renal and gonadal vessels – an ongoing survey. *South Afr J Sci* 1980; 76:237.
3. Nwoha PU, S Adebisi. An accessory quadriceps femoris muscle in Nigerians. *Acta Anat Nippon* 1994; 9:69-71.
4. Notkovich H. Testicular artery arching over renal vein: clinical and pathological consideration with special references to varicocele. *Br J Urol* 1955; 27: 267-271.
5. Notkovich H. Variations of the testicular and ovarian arteries in relation to the renal pedicle. *Surg Gynecol Obstet* 1956; 103: 487-95.
6. Grine FE, Kramer B. Arched gonadal arteries in the South African Negro. *J Anat* 1981; 132: 387-390.
7. Romanes G J. Cunningham's manual of practical anatomy. Oxford University Press, Oxford, 1981; 153.
8. Mc Minn R M H, Hutchings RT. A colour atlas of human anatomy. Wolfe, Holland, 1985; 241.
9. Mina EY, Tachos AA, Rashad M N. Human embryology for medical students. Modern Egyptian Bureau, Alexandria, 1968; 115.
10. Byskov A G, Hoyer PE. In: Knobil, Neil (eds). Embryology of mammalian gonads and ducts. Raven press, New York 1994; 487-540.
11. Giversman A, Carhen E, Keiding N, Skakheback N. E: Evidence of increasing incidents of abnormalities of the human testis: A review. *Env Health (suppl 2)*, 1993; 62-71.
12. Ferguson -- Smith M.A. Clinical contributions towards understanding the

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- genetics of sex differentiation. *Front Endocrinol* 1996; 20: 5-12.
13. Mittwoch U. Unilateral phenotypic manifestation of bilateral structures: which phenotype matches the genotype? *Front Endocrinol* 1996; 16: 121-129.
 14. Sinclair AH. Human sex determination. *J Exp Zool* 1998; 281: 501-505.
 15. Mittwoch U. Phenotypic manifestations during the development of the dominant and default gonads in mammals and birds. *J Exp Zool* 1998; 281: 466- 471.