Scholars Journal of Applied Medical Sciences (SJAMS) ISSN 2320-6691 (Online)
Sch. J. App. Med. Sci., 2014; 2(1D):407-410 ISSN 2347-954X (Print)

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2014.v02i01.0086

Research Article

Variable Origin of Testicular Artery from Renal Artery and Its Clinical Significance in North Indian Population

Dr. Muktyaz Hussein[1], Dr. Vibhu Deep[2], Dr. Prerna Gupta[3], Dr. Arun Kumar Sharma[4], Dr. Arvind Kumar Yadav[5]

[1]Assistant Professor**,** Department of Anatomy**,** Govt. Medical College Ambedkar Nagar, U. P., India
[2, 4]Lecturer, Department of Anatomy, Govt. Medical College Ambedkar Nagar, U. P., India
[3]Assistant Professor, Department of Anatomy, Integral Institute of Medical Sciences and Research, Lucknow, U. P., India
[5]Lecturer**,** Department of Anatomy**,** LLRM Medical College Meerut, U.P., India

***Corresponding author**
Dr. Muktyaz Hussein
Email: muktyazmukky@gmail.com

Abstract: Testicular arteries are paired vessels that normally originate from the abdominal aorta at the level of second lumbar vertebrae and the testicular arteries may variable at their origin and arise from the renal artery, suprarenal artery or lumbar artery. Variations in the anatomical relationship of the gonadal arteries to the renal vessels are frequently reported. The present study was carried out in department of Anatomy Govt. Medical College, Ambedkar Nagar and L.L.R.M.Medical College Meerut U.P. The posterior abdominal walls of 33 male cadavers were dissected and studied during routine dissection for undergraduate and variations in the origin, course of the testicular arteries were recorded carefully. We observed variations of testicular artery origin in 16 cadavers (48.4%) out of 33 cadavers. Right side variation were present in 11 cadavers (33.3%) and Left side in 05 cadavers (15.1%).The knowledge about variable origin of the testicular arteries are importance to urologist, surgeons dealing with kidney retrieval and transplantation, radiologists, persons performing various endourologic procedures and innumerable interventional techniques and avoiding the complications in operative surgery.
Keywords: Testicular artery, Origin, Variations, Renal artery and clinical significance

INTRODUCTION

A sound knowledge of variations of blood vessels is important during operative, diagnostic and endovascular procedures in the abdomen and pelvis. The male gonadal arteries, namely the testicular arteries, may vary at their origin and arise from the renal artery, suprarenal artery or lumbar artery. They may also be doubled, tripled or even quadrupled and may arise as a common trunk. With the advent of new intra-abdominal operative and laparoscopic techniques, the anatomy of the gonadal vessels has assumed much more importance. Testicular arteries are paired vessels that normally originate from the abdominal aorta at the level of second lumbar vertebrae [1].Each testicular artery passes obliquely downwards and posterior to the peritoneum on the psoas major muscle, and enters the inguinal canal through the deep inguinal ring. Along their course, the testicular arteries are accompanied by the testicular veins. They pass through the deep inguinal ring of the corresponding side and then become constituents of the spermatic cord. This knowledge is essential when a surgical approach is made to the abdominal aorta, which includes the basic anatomical relationships of the neighbouring tissues, the important variations in the origin of the aortic branches and applied anatomy, which are not only helpful for the vascular surgeons but also to those who study fluid dynamics[2] .The main aims of this study is to highlight incidence of variable origin of testicular artery from renal artery and its clinical significance in North Indian population and review of literature is to bring awareness to clinicians about the variations of testicular artery and the blood supply of the kidney. Anatomic and morphologic variations of the arteries are important for diagnostic and surgical procedures.

MATERIALS AND METHODS

In the present study observations were made on the cadavers while they were used for routine dissection classes for medical undergraduate students over a period of five years. The materials used for present study comprises 33 adult male cadavers in department of Anatomy Govt. Medical College, Ambedkar Nagar and L.L.R.M.Medical College Meerut U.P. All subjects were from North Indian origin. The embalmed cadaver's dissections were performed on the

abdomen and posterior abdominal wall of all adult male cadavers studied carefully for the variations in the origin and course of the testicular arteries. The abdominal cavity was opened by routine dissection procedure and the retroperitoneal structures were exposed. The Kidneys and connective tissue surrounding the great vessels and their branches and tributaries were removed to provide a clear field of vision. The testicular arteries were observed in particular for their origin course and branches. This was an observational study with no usage of experimental instruments. Appropriate measurements were taken by calipers and measuring tape, the specimens were photographed and the findings were appropriately documented.

RESULTS

In the present study out of 33 cadavers showed the presence of variations of testicular artery origin from renal artery in 16 cadavers (48.4%). Right side variations were present in 11 cadavers (33.3%) right testicular artery origin from accessory right renal artery (figure1), origin of right testicular artery from right renal artery (figure2) and Left side in 05 cadavers (15.1%) origin of left testicular artery from left superior polar artery (figure3).Incidence of variable origin of testicular artery from renal artery shown in table 1.

Table 1: Incidence of testicular artery variations in North Indian population

	Right Side	Left Side	Total Variation (%)
Cadavers Studied (33)	11(33.3%)	05(15.1%)	16 (48.4%)

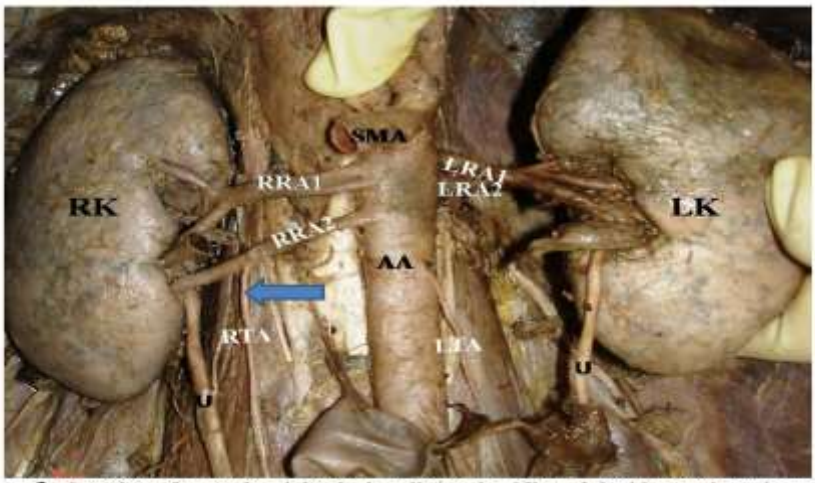

Figure: 1 Dissection of posterior abdominal wall showing bilateral double Renal arteries and Right Testicular Artery origin from Accessory Right Renal Artery with arrow. (RRA1: Right Renal Artery1; RRA2: Right Renal Artery2; LLA1: Left Renal Artery1; LRA2: Left Renal Artery2; AA: Abdominal Aorta; RK: Right Kidney; LK: Left Kidney; U: Ureter; RTA: Right Testicular Artery; SMA: Superior Mesenteric Artery)

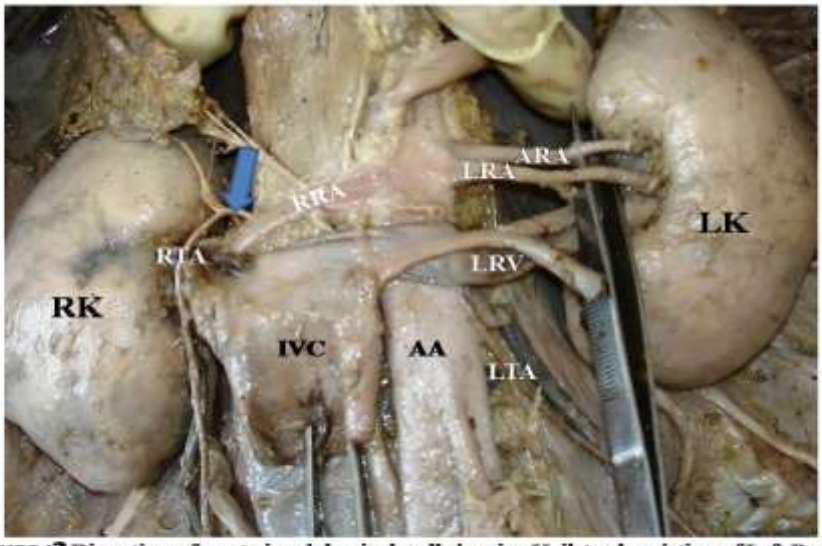

Figure :2 Dissection of posterior abdominal wall showing Unilateral variation of Left Renal artery and origin of Right Testicular Artery from Right Renal Artery with arrow. (RRA: Right Renal Artery; LRA: Left Renal Artery; ARA : Accessory Renal Artery; AA: Abdominal Aorta; IVC: Inferior Vena Cava; RK: Right Kidney; LK: Left Kidney; LRV: Left Renal Vein; LTA: Left Testicular Artery)

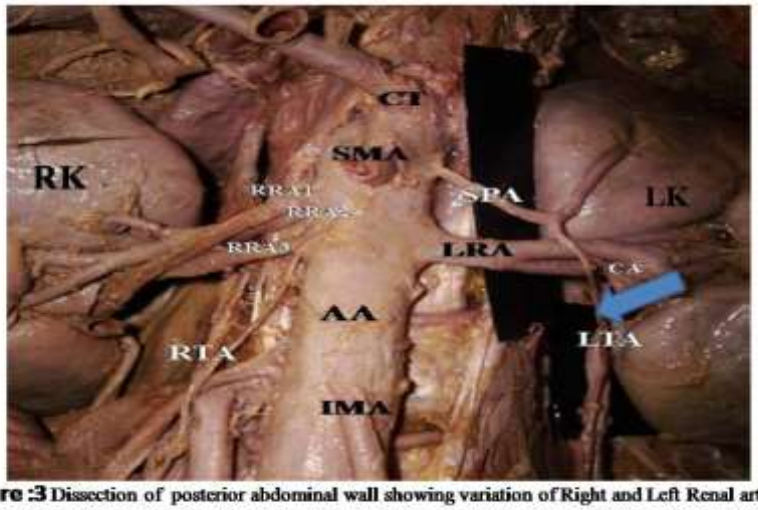

Figure :3 Dissection of posterior abdominal wall showing variation of Right and Left Renal arteries and origin of Left Testicular Artery from Left Superior Polar Artery (SPA) with arrow. (RRA 1: Right Renal Artery1; RRA2: Right Renal Artery2; RRA 3: Right Renal Artery3;LRA: Left Renal Artery; AA: Abdominal Aorta; SMA: Superior Mesenteric Artery; IMA: Inferior Mesenteric Artery; CT: Coeliac trunk; RK: Right Kidney; LK: Left Kidney; RTA: Right Testicular Artery; LTA: Left Testicular Artery).

DISCUSSION

Vascular variations have always been subject of controversy, as well as curiosity because of their clinical significance. Certain vascular and developmental anomalies of kidneys can be associated with variations in the course of the gonadal arteries. Both kidneys and gonads develop during embryonic life from the intermediate mesoderm of the mesonephric crest by Cicekcibasi *et al*. [3]. Their blood supply derives also from a common source, namely the lateral mesonephric branches of the dorsal aorta [3, 4].

Knowledge of variations of blood vessels in the renal hilar region is important during operative, diagnostic and endovascular procedures in the abdomen. Testicular arteries are branches of abdominal aorta usually originating slightly below the renal artery. Bergman *et al*. reported about variations in the origin of testicular arteries, their presence or absence, their origin from other neighboring arteries like the renal artery, the suprarenal artery or the lumbar artery [5]. Origin of testicular artery from the inferior polar artery of the kidney has been reported by Ravery *et al*. [6].

An accessory left testicular artery from the descending aorta has been reported by Loukas and Stewart [7].Left testicular artery originating behind the left renal vein at the level of the left renal artery from the abdominal aorta, and getting entrapped between the two divisions of the left renal vein, has been reported by Satheesha [8]. The persistence of cranial lateral mesonephric artery results in a high origin of the

gonadal artery, probably from suprarenal or from a more superior aortic level studied by Salve *et al*. [9].

The rate of anatomical variation of testicular arteries has been reported to be 14.7% and their origin was either from unusually high level of aorta or from the renal artery [10]. Some accessory arteries enter the poles of the kidney as polar arteries. If an accessory renal artery is ligated or damaged during surgery, the part of the kidney supplied by it is likely to become ischemic, since the accessory renal arteries are end arteries Moore and Persaud [11].

The anatomy of gonadal arteries has assumed importance because of development of new operative techniques within abdominal cavity for operations like varicocoele and undescended testis During laparoscopic surgery of male abdomen and pelvis many complications occur due to unfamiliar anatomy in operative field Thus it becomes imperative to carefully preserve the gonadal artery in order to prevent any vascular troubles of gonad, the gonadal artery being its unique source of blood supply This indicates the importance of arteriography or Doppler ultrasound examination of renal hilum prior to any surgical procedure in this region.

CONCLUSION

The knowledge about these variations is of utmost importance to the urologist, surgeons dealing with kidney retrieval and transplantation, radiologists, persons performing various endourologic procedures and innumerable interventional techniques. Anatomical knowledge of testicular artery is very essential for performing operative techniques of treating varicocele and undescended testes within abdominal cavity. During varicocelectomy, testicular artery must be preserved in order to prevent testicular atrophy.

REFERENCES

1. Standring S, Borley NR, Collins P, Crossman AR, Gatzoulis MA, Healy JC *et al*.; Gray's Anatomy: The Anatomical Basis of Clinical Practice. 40th edition, Vol. 1198. London: Elsevier, Churchill Livingstone, 2008: 207–208.
2. Feller I, Woodburne RT; Surgical anatomy of the abdominal aorta. Ann Surg., 1961; 154: 239-52.
3. Cicekcibasi AE, Salbacak A, Seker M, Ziylan T, Büyükmumcu M, Uysal II; The origin of gonadal arteries in human fetuses: anatomical variations. Ann Anat., 2002; 184(3): 275-279.
4. Ozan H, Gümüsalan Y, Onderoglu S, Simsek C; High origin of gonadal arteries associated with other variations. Ann Anat., 1995; 177(2):156-160.
5. Bergman RA, Cassell MD, Sahinoglu K, Heidger PM Jr.; Human doubled renal and testicular arteries. Ann Anat., 1992; 174: 313-315.
6. Ravery V, Cussenot O, Desgrandchamps F, Teillac P, Martin-Bouyer Y, Lassau JP *et al*.; Variations in arterial blood supply and the risk of hemorrhage during percutaneous treatment of lesions of the pelviureteral junction obstruction: report of a case of testicular artery arising from an inferior polar renal artery. Surg Radiol Anat., 1993; 15: 355-359.
7. Loukas M, Stewart D; A case of an accessory testicular artery. Folia Morphol., 2004; 63: 355-357.
8. Satheesha NB; Abnormal course of left testicular artery in relation to an abnormal left renal vein: A case report. Kathmandu Univ Med J., 2007; 5: 108-109.
9. Salve VM, Ashalatha K, Sawant S, Gajendra K; Variant origin of right testicular artery: a rare case. Int J Anat Variat., 2010; 3: 22-24.
10. Pai MM, Vadgaonkar R, Rai R, Nayak SR, Jiji PJ, Ranade A *et al*.; A cadaveric study of the testicular artery in the south Indian population. Singapore Med J., 2008; 48: 551-555.
11. Moore Kl, Persaud TVN; The Developing Human: Clinically Oriented Embryology. 8th edition, Elsevier, Philadelphia, 2008: 249-250.