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Testicular Artery supplying Supra renal gland

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Abstract

With the advent of new diagnostic, therapeutic and operative techniques within the abdominal cavity, a sound knowledge of the variant courses of the abdominal vessels become important for the dealing clinicians, surgeons and interventional radiologists. Variations from the normal pattern of the origin, course and branching of the abdominal vessels has been reported earlier. Here's a case report of an unusually high origin of the testicular artery from the abdominal aorta at the level of middle suprarenal branch with no separate middle suprarenal branch from the abdominal aorta. This kind of variation should be kept in mind while dealing with retroperitoneal surgeries or renal transplant surgeries.

Introduction

Testicular arteries are paired vessels that usually arise from the antero-lateral surface of the abdominal aorta 2.5 to 5 cm inferior to the origin of renal artery at the level of L2 vertebra. It descends on the posterior abdominal wall, enters the deep inguinal ring, becomes part of spermatic cord along with its other constituents and then travels in the inguinal canal to come out of the superficial inguinal ring to reach the scrotum. It supplies testis and epididymis. Middle suprarenal artery also arises from the abdominal aorta as a lateral branch higher than the origin of renal artery. Suprarenal gland is supplied by this artery along with superior suprarenal artery arising from inferior phrenic artery and inferior suprarenal artery arising from renal artery. Knowledge of these arterial patterns becomes important while dealing with abdominal surgeries, and other radiological interventions etc.

Case report

During routine dissection of the first year MBBS students, we encountered a variable origin of the testicular artery and middle suprarenal artery on the right side (Figure-1) in an approximately 50 year old male cadaver. The testicular artery arose from the abdominal aorta at the level of origin of superior mesenteric artery. After the origin, the artery passed at first laterally, then gave a branch to suprarenal gland which was the middle suprarenal branch, which further branched to supply the gland. The suprarenal gland was also supplied by the superior and inferior suprarenal arteries which arose normally. The testicular artery then curved inferiorly to pass in front of renal artery and then renal vein. At this level the testicular artery was accompanied by testicular vein which was draining into right renal vein. Thereafter both these vessels passed inferiorly, crossed the ureter, psoas major and then entered the deep inguinal ring to become a content of inguinal canal along with other contents of spermatic cord. Then it came out through the superficial inguinal ring and entered the scrotum to supply the testis and epididymis[12].

Discussion

Variations in the origin of testicular arteries are common and are frequently reported. There are reports about the arteries varying at their origin; one or both arteries arising from renal artery, suprarenal artery, lumbar artery or common iliac artery. They may arise from a common trunk, and may be two, three or four on one side. Males are more commonly affected by these arterial variations as compared to females and these variations mostly occur on the right side as compared to the left side. In a case reported by Acar et al.(2007) [1], the right testicular artery was originating from the inferior segmental branch of the right renal artery. The left testicular artery originated from the anterolateral surface of the abdominal aorta just inferior to the left renal artery, was located between the left renal vein and the left renal artery and then descended anterior to the renal vein.Petru et al.(2007)[10] described 16 cases of gonadal arteries originating from the renal artery. Out of 16, in 12 cases (75%), the variation was present on a single gonadal artery while two gonadal arteries appeared in four cases (25%). In 13 cases (81.25%) the gonadal arteries were located on the left side and in only three cases (18.75%) they were on the right. In seven cases (43.75%), a unique gonadal artery that originated from a single renal artery, in three cases (18.75%) the gonadal artery started from the artery of the inferior segment that started from the anterior branch of the renal artery, in other three cases (18.75%), from the trunk of the renal artery, prior to its terminal ramification and in one case (6.25%), from the artery of the superior segment that started from the anterior branch of the renal artery. In five cases (31.25%), a single gonadal artery started from a supplementary renal artery, in four cases (25%), from double renal arteries (three from the inferior and one from the superior one) and in a single case, from triple renal arteries (from the inferior one). All the four cases (25%) of double gonadal arteries were located on the left. Within them, in two cases, the two gonadal arteries started from the renal artery (unique or supplementary) and in the other two cases, the lateral gonadal artery originated from the renal artery (unique or supplementary) and the medial one from the aorta. Brohi et al.(2001)[3], reported a case with high origin of the left testicular artery with a suprarenal branch from it on the left side. Ozan et al.(1995)[8] described two cases, one male and one female, in which the gonadal arteries, together with accessory renal arteries, originated from the abdominal aorta at a higher level than normal. On one side, right middle suprarenal artery and a parenchymal branch to the kidney arose from the right testicular artery by a common trunk. Ondergolu et al.(1993)[7], reported a right testicular artery which gave off inferior phrenic and superior suprarenal arteries. One double testicular artery was found on the right side in a study conducted on south Indian population by Pai et al.(2008)[9]. In a study conducted among 90 foetuses by Emine et al.(2002) [4], variation of the origin of gonadal artery was classified into four types: type-I – from suprarenal, type-II- from renal artery, type-III-high origin close to renal level, type-IV- duplication of testicular arteries. Gonadal arteries possess a mesonephric origin, so with the descent of testis, it will be supplied successively from different lower levels, while the upper branches suffer a major atrophy[9]. According to Odekunle A et. al.(2007)[6], gonadal artery embryologically develops from caudal group of lateral mesonephric artery. Interruption or complete arrest of any developmental stage may produce various variations in origins, number and course of these arteries. Moore & Persaud (1993)[5] stated that the variation of the testicular arteries are attributed to their embryonic origin from the lateral splanchnic arteries from the aorta and when the gonads descend new splanchnic arteries develop and the higher one atrophies. In this case, we assume that the higher arteries might have persisted, thus resulting in higher origin from the aorta.

With the advent of newer trends in operative techniques, anatomical knowledge of testicular artery becomes essential while performing surgeries treating varicocele and undescended testes within abdominal cavity. Testicular artery must be preserved to prevent testicular atrophy during these surgeries. Also during laparoscopic surgery of the male abdomen and pelvis many complications can occur due to unfamiliar anatomy in this operative field. Thus it becomes imperative to carefully preserve the gonadal artery in order to prevent any vascular troubles of the gonad, the genital artery being its

unique source of blood supply.[3,2] Therefore, awareness of the possible existence of such variations of testicular arteries is of great importance during surgical procedures in this region. The suprarenal arteries too are quite common when the variation comes as described by Brohi et al.(2001)[3], Ozan et al.(1995)[8] & Ondergolu et al.(1993)[7] Knowledge of such variation might help surgeons during surgery in the cases of spontaneous retroperitoneal hemorrhage from adrenal artery aneurysm. It is also important during laparoscopic adrenalectomy as such variations may affect the orientation of the surgeon. The thorough knowledge of anomalous arterial anatomy of the suprarenal gland is required for surgical and radiological interventions of retroperitoneal organs of upper abdomen to avoid complications.

Conclusion

Eventually, our findings have to be kept in mind during surgical procedures in the posterior abdominal wall. This kind of anomaly may cause confusions during varicocele surgeries or surgeries for the correction of undescended testis or during adrenalectomy operations. the testicular artery may get damaged if the existence of such possible variation is not kept in mind and can lead to degeneration of the testis since genital artery is the single blood supply the this very important organ for the fundamental process of reproduction that allows the living organisms to preserve their progeny therefore the knowledge of variations of vessels and retroperitoneal region may greatly contribute to the success of surgical, invasive and radiological procedures of this area. Also, knowledge of these variations may also provide safety guidelines for endovascular procedures like therapeutic embolisation and angioplasties.

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FIGURE-1

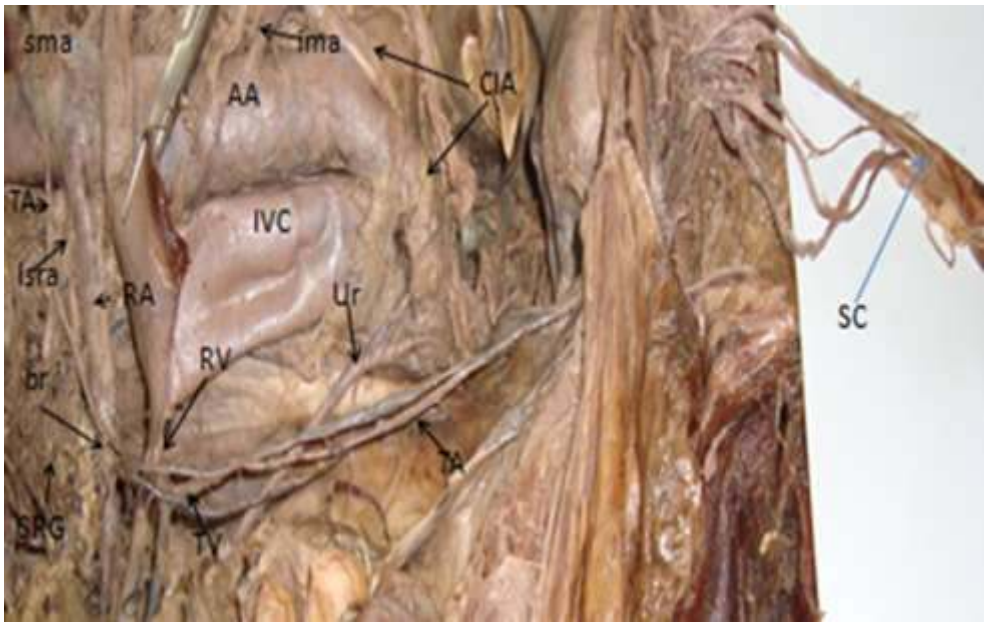

Figure-1: TA- Testicular Artery,TV- Testicular Vein,AA- Abdominal Aorta,IVC- Inferior Vena Cava, Ima – Inferior Mesenteric Artery, Sma- Superior Mesenteric Artery, RA- Renal Artery,RV- Renal Vein, Ur- Ureter,CIA- Common Iliac Artery, ISRA- Inferior Suprarenal Artery, SRG- Suprarenal Gland,Br- Branches To Suprarenal Gland,SC- Spermatic Cord