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Case Report

VARIATION IN ORIGIN OF SUPRA RENAL ARTERIES A CASE REPORT

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ABSTRACT

Suprarenal glands are among the most vascular organs in the body and they are richly supplied by the vasculature from the various sources. Suprarenal glands are supplied by three arteries namely superior, middle and inferior suprarenal artery. Superior arise from inferior phrenic artery, Middle arises from abdominal aorta. Inferior arises from the renal artery. Variation in arterial anatomy of suprarenal gland is significant for radiological and surgical interventions. Knowledge of anomalous supra renal artery is required to avoid complications in surgical procedure.

Keywords: Suprarenal arteries, Suprarenal Gland, Renal artery, Abdominal aorta.

INTRODUCTION

Suprarenal glands are highly vascular and blood flow is equivalent to that of thyroid gland approximately 5ml/min/gm of gland. This is supplied by three arteries namely superior, middle and inferior supra renal artery¹. Superior supra renal artery; arises from inferior phrenic artery, Middle arises from abdominal aorta, Inferior from the renal artery from main artery or its upper pole branches². Knowledge of anomalous arteries to suprarenal gland is significant for radiologists and surgical interventions. These variations cannot be ignored³.

CASE REPORT

During routine dissection for 1st year MBBS students 2013 - 2014 batch in department of Anatomy, M. R. Medical college, Gulbarga, following variation in origin of suprarenal arteries is observed in an adult male cadaver. On left side, just above the left renal artery a common trunk was noted arising from abdominal aorta which later trifurcated into three branches superior, middle and inferior suprarenal arteries. On right side superior suprarenal artery arises from inferior mesenteric artery, middle suprarenal arises from abdominal aorta and inferior suprarenal arises from right renal artery.

DISCUSSION

Sander TW described an embryological basis of blood supply to suprarenal gland which will help to substantiate the reasons for varied blood supply. Blood vessel development occurs by two mechanisms: Vasculogenesis (major vessels) and angiogenesis (remainder of vascular system). The entire system is guided by growth factors like vascular endothelial growth factors⁴.

Hamilton WJ et al described, the main longitudinal trunks in embryo are primitive dorsal aortae. These dorsal aortae give off paired somatic intersegmental, lateral visceral branches and splanchnic branches. The lateral splanchnic arteries is distributed to the structures developed from intermediate mass of the suprarenal gland. They form irregular series of vessels known as rete arteriosus urogenitale. There was a pair in each segment of the body but many of them disappear, and the series is represented in adult only as the supra renal's, the definitive supra renal arteries became branches of the renal and inferior phrenic thus receiving the original embryonic coordination⁵.

Kalthur et al observed multiple variations in upper abdominal vessels. A long and unusually thick celiac trunk was observed arising ventrolaterally at the level of T12 and L1. The celiac trunk gave rise to four branches

such as left gastric artery, common hepatic artery, a tortuous dorsal pancreatic artery and a non tortuous splenic artery. The right inferior phrenic and right middle suprarenal arteries were arising from right renal artery via a common trunk. The right superior suprarenal artery originated from inferior phrenic and right inferior suprarenal artery from inferior aspect of renal artery. On left side, just above left renal artery a common trunk was arising from abdominal aorta which later divided into superior branch supplying diaphragm is left inferior phrenic artery, which also gave rise to left superior suprarenal artery. The inferior branch is the left testicular artery⁶.

Sushma et al studied 20 formalin fixed cadavers i.e 40 cases and they observed variation in arterial pattern of 7 cases (2 bilateral). Case 1: On the right side, the middle suprarenal artery was arising from the renal artery and on the left side from the inferior phrenic artery. Case 2: On the right side, middle suprarenal artery and inferior suprarenal artery were arising from accessory renal artery while on the Left side the middle suprarenal artery was arising from the coeliac trunk & inferior suprarenal artery from accessory renal artery. Case 3: On the Left side, 2 to 3 small twigs of the middle suprarenal artery were arising from the abdominal aorta while inferior suprarenal artery was a branch of the accessory renal artery. The superior suprarenal artery was however normally arising from the inferior phrenic artery. Normal arterial pattern was observed on the right side. Case 4: Right side showed the inferior phrenic artery originating from the renal artery. The suprarenal gland was entirely supplied by branches arising from the junction between the renal artery and inferior phrenic artery. The arterial pattern was normal when observed on the left side. Case 5: On the right side, the inferior phrenic artery was arising from the renal artery. The arterial supply of the suprarenal gland was provided by twigs arising from inferior phrenic artery. Normal arterial pattern was observed on the left side⁷.

Siraj Ahemed et al reported a case where he made following observation, On the right side, Superior suprarenal artery originated from inferior phrenic artery which was direct branch from celiac trunk. This inferior phrenic artery gives branch to left supra renal gland, it also gives branches to diaphragm (accessory inferior phrenic artery). Inferior suprarenal artery taking origin from right renal artery, after this it trifurcates, superior and middle polar arteries gives accessory branches to suprarenal renal gland. On the left side, superior suprarenal artery was branch from inferior phrenic artery which was a direct branch of celiac trunk, along with accessory branch from right inferior phrenic artery which was discussed earlier. Inferior suprarenal artery originates from left renal artery⁸.

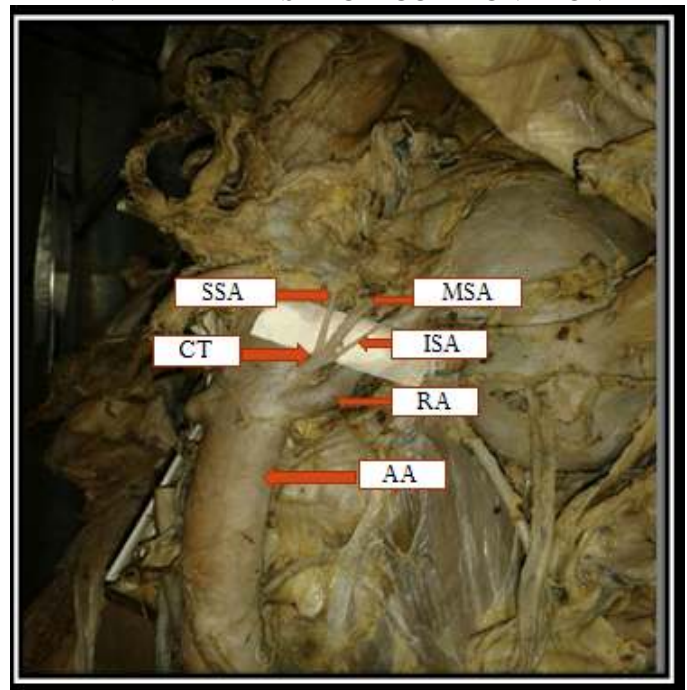
Manso et al studied arterial supply to suprarenal gland in 30 human cadavers and drawn a following conclusion. The superior and the inferior groups were present in all cases, since the middle vessels appeared in only 93.3% +/- 4.6 of the cases. The superior group included on each side 4 arteries in males and 5 in females; the middle group presented only 1 artery on each side in both males and females, and the inferior group

exhibited on each side 2 arteries in males and 1 artery in females. The most variable group was the middle one, the aortic origin being the most frequent but with a relatively low incidence (53.3% +/- 9.1 on the right and 46.7% +/- 9.1 on the left). The superior group originated from the posterior branch of the ipsilateral inferior phrenic artery in 83.3% +/- 6.8 on the right and 80% +/- 7.3 on the left. The arteries of the inferior group were branches of the ipsilateral renal artery in 70% +/- 8.4 on the right and 50% +/- 9.1 on the left. The origin of the middle suprarenal arteries from the trunk of the inferior phrenic artery on both sides (26.7% +/- 8.1 on the right and 36.7% +/- 8.8 on the left) should be considered relevant⁹.

CONCLUSION

In recent times, trends in surgical procedures are to move towards minimal invasive surgery for reasons of decreased morbidity and mortality. It is concluded that pattern of supra renal blood supply varies to such an extent that no two are alike. A thorough knowledge of arterial anatomy of suprarenal gland is required for surgical interventions of upper abdominal organs to avoid complications.

PHOTOGRAPH SHOWING THE ORIGIN OF SUPRA RENAL ARTERIES FROM COMMON TRUNK



- > SSA-SUPERIOR SUPRARENAL ARTERY
- > MSA-MIDDLE SUPRARENAL ARTERY
- > ISA-INFERIOR SUPRARENAL ARTERY
- > RA-RENAL ARTERY
- > AA-ABDOMINAL AORTA
- > CT- COMMON TRUNK

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