

Study of origin of inferior Phrenic arteries

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Abstract

Aim: The knowledge of arterial anatomical variation is important for surgical and radiological diagnoses. **Objective:** Inferior phrenic arteries which supply the diaphragm are known to have variation in their origin. With the available literature which has been reviewed, the present study intends to verify these variations. **Methods:** 24 adult human cadavers preserved in 10% formalin were obtained from department of Anatomy, Hassan Institute of Medical Sciences, Hassan and origin of IPA was studied. **Result:** IPA has its usual origin from abdominal aorta in 20 cases. In 2 cases they were arising from the celiac trunk, LIPA from left gastric artery in 1 case and RIPA from the celiac trunk in 1 case. **Conclusion:** The knowledge of variation in anatomical arterial structure are important in abdominal operations to avoid unintentional damage or sectioning of small caliber arteries and during invasive arterial procedures.

Key Word: inferior phrenic arteries, Anatomy.

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INTRODUCTION

The inferior phrenic arteries are the first paired branch from abdominal aorta which may have a common stem above the celiac trunk and slope towards the crus of diaphragm. LIPA passes behind the esophagus while RIPA passes behind the inferior vena cava. They give small superior suprarenal branches along their course¹. IPA may also arise from celiac trunk on one (or) both the sides²(Gray's Anatomy-40th edition). The vascular variations are constantly observed during dissection of the adult cadavers. The purpose of our study is to further potentiate the known facts about the variations of the IPA especially of those having relevance in various procedures.

MATERIAL AND METHODS

Twenty four cadavers were dissected which were embalmed in 10% formalin solution in Department of

Anatomy, Hassan Institute of Medical Sciences, Hassan. Routine dissection of the abdominal aorta of the cadaver with reference to Cunningham's manual of Anatomy(Vol.-2, 15th edition)³ and Gray's Anatomy(40th edition)² was carried out and the branching pattern of the abdominal aorta with respect to inferior phrenic arteries was noted. Any variation with respect to origin and course of the Inferior Phrenic Arteries was noted and photographs of the same were taken.

DISCUSSION

Knowledge of vascular anatomy with its variations is very important to radiologists and surgeons. The celiac trunk and its branches show several variations and seem to have a classical trifurcation in 86% of cases as per a study by Sankar *et al*⁴. Vascular variations of IPA are usually asymptomatic, but they gain considerable importance patients undergoing colicography for GIT bleeding, celiac axis compression syndrome prior to operative procedure, trans arterial chemo-embolization procedures, to avoid unintentional damage or sectioning of these small arteries. As these arteries have found to originate from renal arteries and as they give the suprarenal branch they have profound importance in renal transplantation and renal tumor excision surgeries¹. As per the literature available, a study by Gwon *et al* over 4 years with respect to 383 interventional procedures related to IPA, almost equal frequencies of RIPA and LIPA arising

from aorta and celiac axis was observed along with various other sites of origin like left gastric, hepatic, superior mesenteric, spermatic and adrenal arteries were seen⁵. A study by Pulakunta *et al* presents a variation in the form of arteries arising from celiac trunk in 2 cases, from left gastric artery and right renal arteries in 2 cases⁶. In a study conducted by Petrella *et al* on 89 cadavers, they

report their findings of LIPA arising from the left contour of the celiac trunk in 19 cases (21.35%) to be in accordance with the studies done by Pick and Anson(1940) on 200 cadavers of the same variation in 34 of them(17%) and that of RIPA arising from right contour of celiac axis in 3 cases which is similar to that of the results reported by Lipshutz⁷.

In our study conducted on 24 cadavers, we found variations in 4 of those cases. Their particulars are as follows:

	<u>RIPA</u>	<u>LIPA</u>
Case 1	Directly from abdominal aorta	Left Gastric Artery
Case 2	Right contour of celiac trunk	Left contour of celiac trunk
Case 3	Right contour of celiac trunk	Left contour of celiac trunk
Case 4	Right contour of celiac trunk	Directly from abdominal aorta



RESULTS

In the present study variation of its origin were noted, 4 out of 24 cases showed variations. In one case the LIPA had its origin from Left gastric artery. Both RIPA and LIPA arose directly from celiac trunk on either side but not as common stem in 2 cases. In one case the RIPA had its origin from the right contour of the celiac trunk.

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