

## ORIGINAL ARTICLE

# Anomalous Origin and Course of Left Ovarian Arteries in Humans

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## Abstract

**Background:** Variations in origin and course of gonadal arteries is common in males however there are few instances where there is variation in ovarian arteries seen in females which could be of importance. **Methods and Results:** This study reports occurrence of anomalous origin and course of left ovarian arteries in humans. Among 30 female cadavers studied, one presented with anomalous left ovarian artery, which arise from the left renal artery behind the left renal vein, ascended upwards to arch over the renal vein and descended anterior to the renal vein on to the posterior abdominal wall. **Conclusion:** Knowledge on the course of the ovarian artery is of interest not only to anatomists but also to surgeons, radiologists, especially urologists and gynecologists when they perform operative procedures in that region. Better knowledge of the anatomic variations of the ovarian artery is necessary to prevent inadvertent surgical complications.

**Keywords:** Ovarian Artery, Renal Artery, Renal Vein, Ovarian Vein, Kidney

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## Introduction

Reproduction is a method evolved for the survival of species by producing continuous streams of new generations which replaces the old and dying ones. Ovaries are important female reproductive organs upon which survival of human species depends. The ovarian arteries are paired lateral branches of abdominal aorta and are principal source of arterial supply to ovaries. Each artery descends behind the peritoneum in the paracolic gutter, and at the brim of the pelvis crosses the external iliac artery and vein to enter the pelvic cavity. In the pelvis, it runs medially within suspensory ligament of ovary below the uterine tube and reaches the ovary through the mesovarium<sup>[1]</sup>.

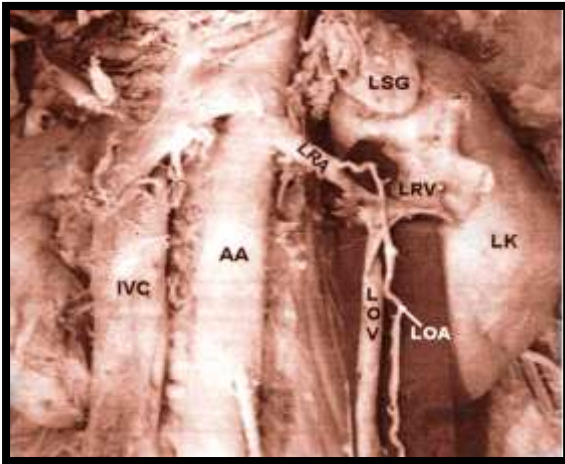
According to Notkovich (1956), the Gonadal arteries have been classified into three types based on their anatomical relationship with renal vein. These are Type I in which the Gonadal arteries arise from aorta behind or below the renal vein and proceed downwards and laterally. Type II where the arteries arise from the aorta above the level of the renal vein and crosses in

front of it. Type III is where gonadal arteries arise from aorta behind or below the renal vein and courses upwards to arch over the renal vein<sup>[2]</sup>. There are many reports in literature regarding variations in origin, course and number of Gonadal arteries<sup>[3-5]</sup>. Here we present a rare case of variant origin and course of left ovarian artery for the attention of Anatomists, Surgeons and Radiologists.

## Materials and Methods

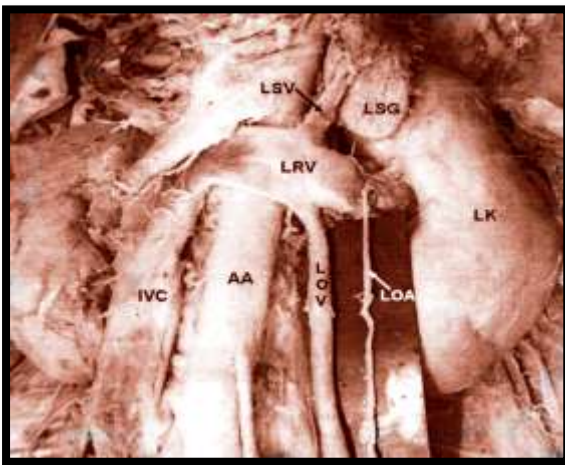
30 female cadavers were studied to see the origin and course of left ovarian arteries. Among the above, one specimen showed anomalous left ovarian artery (Fig 1, 2). The Origin and course of the left ovarian artery was normal in other specimens. The cadavers were dissected according to the instructions of Cunningham's manual of dissection. Briefly, a midline incision was made extending from xiphoid process to pubic symphysis. The skin, fascia and muscles were separated to enter the abdominal cavity. The abdominal aorta and left ovarian artery were identified.

**Figure 1:** Photograph showing unusual course of left ovarian artery



LOA – Left Ovarian Artery; LOV – Left Ovarian Vein; LRV – Left Renal Vein; LSV – left suprarenal vein; LK – Left Kidney; LSG – Left Suprarenal Gland; AA – Abdominal Aorta; IVC – Inferior Vena Cava

**Figure 2:** showing Left Ovarian artery at its origin. Left renal vein has been cut and reflected LRA



Left Renal Artery; LRV – Left renal vein (Reflected); LOA – Left Ovarian Artery;

## Results

The left ovarian artery was found to originate from the left renal artery behind the left renal vein nearer to the hilum of the Kidney (Fig 2) in a 45 years old cadaver. It coursed upwards and to the left till it reached the upper border of the left renal vein. At this point the artery turned downwards and descended anterior to the left renal vein (Fig 1) and further coursed

downwards on the posterior abdominal wall lateral to the ovarian vein and entered the pelvis to reach the ovary. The termination of left ovarian vein was found to be normal.

## Discussion

There are only a few cases of variation of ovarian arteries available in the literature as compared to variation of testicular arteries. The frequency of Gonadal arterial variations is more common on right side [6]. It is previously reported that the Gonadal arteries may originate from the aorta at a higher level or may arise from the renal artery, suprarenal artery or accessory renal artery [3, 7, 8]. They may also give branches to diaphragm and suprarenal glands [7]. In these studies it is not shown that the artery can pass in front of renal vein, but the present case describes it. Arched course of the Gonadal artery as we have reported here is a rare variation in the female. The arching course of the left ovarian artery might compress the left renal vein. The hypertension in the left renal vein can produce hematuria [9] and can cause dilatation of the left ovarian vein. The close relation of ovarian artery to the kidney in the present case makes it vulnerable during kidney transplants or other surgeries involving ovaries. During the surgery if the ovarian artery is damaged bilaterally, adverse complication may occur resulting in infertility, early menopause or sexual dysfunctions due to absence of ovarian hormones, particularly in premenopausal women. In a study by Machicki and Grzybiak (1997) five cases were found with atypical course of renal and Gonadal vessels along with developmental anomalies of the kidney and ureters [10]. In our case, there was variant origin and atypical course of ovarian artery but no developmental anomalies of the kidneys and ureters were found.

The variations of the ovarian arteries can be easily understood in relation to the embryological development of the gonads and kidneys and their vascular supply. The Gonadal arteries are present branches of mesonephric arteries that develop cranially and caudally to the renal pedicle. If the latter persists, they produce the type I. If the former persists, they become type II by crossing the renal pedicle with the descent of the gonad. If the kidney ascends much higher, carrying its renal vein to a

higher level than the origin of the Gonadal artery, the latter will be forced to follow an arched course around the vein giving rise to the type III. The fact that the kidney ascends on the left side, generally higher than on the right, gives us the explanation for the higher frequency of the type III on left side [2].

The present case is beyond Notkovich's (1956) classification of Gonadal arteries [2]. According to Notkovich type III classification, Gonadal arteries arise from the aorta here the left ovarian artery was originating from the left renal artery behind the renal vein and arching over the renal vein. Normally the Renal, Suprarenal, Gonadal and phrenic arteries are derived from the lateral splanchnic arteries arising from the primitive *dorsa aortae* in the embryonic life [1]. The developmental reason for the present variation is persistence of embryonic lateral splanchnic arteries which are meant for kidney and gonad on the left side.

### Conclusion

Knowledge on the course of the ovarian artery is of interest not only to anatomists but also to surgeons, radiologists, especially urologists and gynecologists when they perform operative procedures in that region. Better knowledge of the anatomic variations of the ovarian artery is necessary to prevent inadvertent surgical complications.

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