

# MECKEL'S DIVERTICULUM WITH A PERSISTENT OMPHALOMESENTERIC ARTERY- A CASE REPORT

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## ABSTRACT

Vitello-intestinal (omphalo-mesenteric) duct connects the developing mid-gut to the extraembryonic part of yolk sac. It remains patent and connected to the intestines until the fifth to ninth week of gestational period. Meckel's diverticulum is a vestigial remnant of vitello intestinal duct. During routine dissection, one of the cadavers showed Meckel's diverticulum with persistent omphalomesenteric artery. This can cause complications in the form of ulceration, haemorrhage, intussusception, and intestinal obstruction. The aim of this paper is to review the literature of persistent omphalomesenteric artery and to discuss the clinical significance of this condition.

**Keywords:** Vitello-intestinal duct, persistent, diverticulum, omphalomesenteric artery

## 1. Introduction:

Meckel's diverticulum is the most common congenital malformation of gastrointestinal tract. It is also the most common cause of bleeding in paediatric age group.<sup>1</sup> It is a true diverticulum typically located on the antimesenteric border and contains all three coats of intestinal wall with its separate blood supply from vitelline artery.<sup>1</sup> Demonstration of vitelline artery which is an anomalous end branch of superior mesenteric artery, by arteriography is pathognomonic.<sup>2</sup> It is one amongst those rarer conditions which are encountered in surgery and precipitate practical problems worthy of consideration.<sup>3</sup> Isolated Meckel's diverticulum has been reported in literature by many authors but Meckel's diverticulum with persistent artery is rare.<sup>4,5</sup> Here we report a case of Meckel's diverticulum with persistent omphalomesenteric artery and review the current literature, embryological basis of this forgotten entity for its clinical diversity, diagnostic difficulty and management controversies.

## 2. Case Report:

The variation was observed during routine dissection of male cadaver in the department of anatomy in a Medical College situated in rural area of Karnataka, India. The history of the individual and the cause of the death was not known.

The small intestine and Meckel's diverticulum with persistent artery were dissected and our findings were recorded by photography. A portion of the diverticulum and a part of the artery was processed for histological study and stained with haematoxylin and eosin.

This anatomical entity exhibited a length of about 10.2cm and had a diameter of 2.5cm. This structure (Meckel's diverticulum) was found to be attached (a) at one end to the antimesenteric

border of the terminal part of the ileum approximately at a distance of 60.2cm proximal to the ileocaecal junction and (b) at the other end attached by persistent vitellointestinal artery present within a fibrous cord to ileal mesentery. (Fig.1, Fig.2 Fig.3)

Grossly the interior showed circular mucous folds which were similar to that of ileum. Histological studies revealed the presence of ileal tissue in the diverticulum and confirmed the presence of an artery within the fibrous cord.

## 3. Discussion and embryological basis:

The yolk sac is demonstrable at the second week of intrauterine life. The extraembryonic part of the yolk sac and the primitive gut (mid-gut) are connected to each other by the yolk stalk or omphalomesenteric duct (vitellointestinal duct). During the first week of embryonal development, the aorta is a paired structure. From each portion a prominent vessel courses ventrally to the primitive gut and thence out along the yolk stalk to reach the extraembryonic part of the yolk sac. With the merging of the paired aorta into a single aorta the two main ventral branches merge and the resultant vessel comes to be the superior mesenteric artery, or it may be postulated that in certain cases these ventral branches do not merge and that one of the large ventral branches grows while the other recedes, the developing one becoming the superior mesenteric artery. If the other ventral branch does not recede completely but persists in an attenuated form it may be identified later as the persistent omphalomesenteric vessel, at least that part running from the ileal mesentery to a Meckel's diverticulum. When the main ventral vessels have merged to one main trunk, this single ventral artery reaches the midgut and the artery's continuation out along the vitelline duct is a paired one. At the time when the vitelline duct

regresses (after 6 weeks) one or more vessels which ran along the vitelline duct from the gut to the yolk sac may not disappear but persist to be labeled a persistent vitellointestinal artery.<sup>3</sup> Manifestations of this artery could be in the form of intraabdominal fibrous band which may or may not contain a patulous vessel. We reported a patulous artery within the cord uncovered by peritoneum, attaching the Meckel's diverticulum to the ileal mesentery. Its incidence being 32% as reported by previous authors<sup>3</sup>

The first case of persistent omphalomesenteric artery was reported by Sandifort in 1777. Meckel, in 1809, reported a case, and was the first writer to suspect the true origin of this condition. Fitz in 1884 gave an excellent resume of the cases reported upto that date, disproved the view that these bands were inflammatory in origin, and clearly described the manner they arose.<sup>3</sup>

Clinical manifestations of this condition includes acute intestinal obstruction, recurrent abdominal pain and intraabdominal haemorrhage, gangrene of Meckel's diverticulum as a result of torsion of its neck contributed to, and maintained by, a taut omphalomesenteric artery.

The diagnosis of Meckel's diverticulum with omphalomesenteric artery requires meticulous angiographic technique and a high index of suspicion. With an increased use of digital subtraction angiography and the use of super selective studies particularly when an area of increased vascularity is seen in the region of distal ileal arteries, arteriography may prove to be the most sensitive investigation<sup>6</sup>

#### Conclusion:

Meckel's diverticulum with a persistent omphalomesenteric artery is a rare condition and is of interest because of its variable clinical manifestations and its unique embryological origin. No characteristic set of signs and symptoms can be called pathognomonic of persistent vitelline artery.<sup>1</sup> It is well to know, however that it may be one of the underlying causes of intraabdominal pathology that one may occasionally encounter.<sup>3</sup> From the review of literature analysis of above case report, the surgeon must always bear in mind the possibility that Meckel's diverticulum with a persistent omphalomesenteric artery may be the aetiological factor in any acute abdominal emergency, especially when specific diagnosis is difficult. The present paper will highlight the embryological basis and related clinical implications of the Meckel's diverticulum with persistent artery.

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**Fig:1 Small intestine with mesentery showing Meckel's diverticulum**



**Fig:2 Meckel's diverticulum with persistent omphalomesenteric artery**



**Fig:3 Meckel's diverticulum attached to the ileal mesentery by fibrous cord**

