



## Omental Infarction: A Broad View

Authors

**Dr Praveen G P<sup>1</sup>, Dr Krishna Prasad K<sup>2</sup>, Dr Amal Abraham<sup>3</sup>, Dr Munireddy<sup>4</sup>**

<sup>1</sup>Assistant Professor, Dept of Surgery, Sri Devraj URS Medical College, Tamaka, Kolar, Karnataka, India 563101, Phone No: 9901329190

<sup>2</sup>Professor, Dept of Surgery, Sri Devraj URS Medical College

<sup>3</sup>Senior Resident, Dept of Surgery, Sri Devraj URS Medical College

<sup>4</sup>Junior Resident, Dept of Surgery, Sri Devraj URS Medical College

### Abstract

*Omental infarction is one of the rare causes of acute abdomen which is often mistaken for acute appendicitis. Though there is no evidence of exact etiology, many of the predisposing factors have been attributed especially obesity in causation of this condition. It is common in young and middle age females but recently there is increase in the pediatric subjects due to significant lifestyle changes and thorough workup. Patients present with severe right sided pain abdomen rarely with fever or on the contralateral side. Signs of peritoneal irritation are present on examination which rarely leads to the accurate diagnosis of omental infarction. Computed tomography is gold standard tool to diagnose with specific hyper echoic fatty mass located between transverse or ascending colon and anterior abdominal wall. Though conservative treatment was practiced earlier, surgical modality with laparoscopic removal has warranted in faster recovery and clinical improvement with least complications.*

### Introduction

Since a century, due to the inventions in diagnostic tools and thought process of surgeons in the pathological lines, omental infarction, one of the rare causes of acute abdomen has been found out. Often confused with the other surgical conditions which cause acute abdomen, resembling mostly with acute appendicitis<sup>1, 2, 3</sup>. Since last few years, the incidence and frequency of the cases has been increasing<sup>4</sup>. Various causes for the condition have been worked out. Computed tomography has been the standard tool to diagnose this condition. Both conservative and surgical treatment modalities have been tried with

more success rates in the later. An attempt is made to define the characteristics to come up with the knowledge and treatment modality with thorough review of literature and standard reference books.

### Etiopathogenesis

The omentum also called as epiploon is a large apron like fold of visceral peritoneum that hangs down like a sheet from the stomach especially from the greater curvature, in front of the intestines and reflecting back to join transverse colon. Embryologically it develops from the dorsal mesentery and derives its major blood supply from celiac trunk through gastroepiploic

arteries. This fat laden peritoneal fold is divided anatomically into left (gastro-phrenic and gastro-splenic) and right (gastro-colic) ligaments.

The first description on omental pathology was by Bush<sup>5</sup> in 1896 and Eberts<sup>6</sup> in 1920 describing about the hemorrhage in greater omentum. But Johnson<sup>7</sup> is generally credited with the first authenticated description of omental infarction in his report of a case in 1932. Omental infarction is seen in all the age groups from 3 year old to 72 years old according to the reported cases till now. It is most commonly noted among adults nearly 85% of the times with highest frequency in second and fifth decade of life<sup>8,9</sup>.

Many theories have been postulated for the cause of omental infarction either anomalous arterial supply to the omentum, kinking of veins associated with increased intraabdominal pressure or vascular congestion after large meals. Developmental anatomy of the omentum suggested that it may contribute to the pathogenesis of the lesion. Beginning in the embryo of 12 to 14mm<sup>10</sup>, the stomach rotates on an axis in two planes to attain its final transverse position. During this process, the dorsal mesogastrium is converted into a pouch-like double fold forming the greater omentum. As the omentum descends, the transverse colon ascends to its adult position, so that after the fourth month of fetal life the posterior layer of the omentum lies over and adheres to the transverse colon. The ventral mesogastrium subsequently gives rise to the lesser omentum, and from its right border, known as the hepatoduodenal ligament.

There occasionally arises an abnormal extension which may become incorporated with the greater omentum<sup>11</sup>. This secondary portion of omentum may become attached to the ascending colon and sometimes to the terminal ileum and may also extend beyond the right colon and attach to the anterior peritoneum, known as the ligament of Haller, is particularly likely to be ascribed to some antecedent inflammatory process<sup>12</sup>. The size, shape, weight, and position of the omentum vary markedly. In obese individuals the

greater omentum may attain large proportions of fat while in thin individuals it is very less.

The infarcted areas in greater omentum which arise from ventral mesogastrium, attached to the rest of omentum through weak bands of fusion. The blood supply to these areas is very tenuous, coming from either the lesser omentum and secondarily via the greater omentum, kinking of these veins due to position or vascular congestion following large meals especially fat rich food has been one of the causes<sup>13</sup>. A sudden increase in intra-abdominal pressure may also produce thrombosis and extravasation of blood resulting in infarction. Though the infarcted areas are the free borders of the omentum, these areas have always been adherent to either the colon or the anterior peritoneum.

One of the major predisposing factors that have attracted surgeons is obesity with BMI >30 irrespective of the age. Since last two decades, incidence of omental infarction in children is rising mainly because of increase in pediatric obesity. This might be explained that increased fat deposition in obese children decreases the blood supply to the developing omentum, leading to either relative ischemia as the inciting event, increased omental weight leading to torsion, or traction to the most distal parts of the omentum. Other possible predisposing factors for primary or secondary torsion are sudden increase in intraabdominal pressure following heavy meals, heavy exertion, change in the body position, coughing or sneezing and possibly use of occupational vibrating tools<sup>14,15</sup>, congestive heart failure, digitalis administration and occlusive vascular disease.

The works of Wrzesinski and his associates<sup>16</sup> in 1956 outlined the diagnostic criteria that distinguish primary idiopathic segmental infarction from omental infarction due to other causes such as torsion and strangulation in hernias. For primary torsion of the omentum to occur, there must be a redundant, mobile segment of tissue and a fixed point around which the segment can twist<sup>17</sup> resulting in venous obstruction

with resultant edema and arterial compromise. This is followed by infarction and gangrene. This is generally due to omental anomalies such as bulky bifid or accessory omentum, or to abnormally redundant omental veins.

Secondary torsion usually occurs in association with intraabdominal pathology such as hernia, tumor, cyst or adhesions<sup>18</sup>. Omental infarction in the absence of torsion has been reported secondary to hypercoagulable states, vasculitis, and pancreatitis. The omentum generally is found torsed around the distal right epiploic artery resulting in right-sided abdominal pain in 90% of cases.

### **Clinical presentation**

Most of the times, it is young and middle aged women<sup>19</sup>, though it can affect any age group. The majority of cases reported in the literature was segmental involving the right side of the omentum with right lower quadrant (90%) or right para-umbilical pain mimicking acute appendicitis, acute cholecystitis, perforated duodenal ulcercecal diverticulitis or epiploic appendagitis<sup>20</sup>. The reason for this right-sided predilection is related to a variety of anatomic features including malformations of the omental pedicle, a bifid right omentum, and greater mobility of the right side of the omentum. Rarely left sided pain abdomen has been documented. Venous thrombosis within the omental arcade may also be the initiating event.

Other symptoms are nausea, vomiting and occasionally fever and diarrhea. None of the physical findings are characteristic though tenderness in right side of abdomen in lumbar and iliac fossa is noted with or without rise in temperature. It is often confused as acute appendicitis and the severity is of the same order as of that, are subjected to further management in lines of acute appendicitis.

### **Diagnostic workup**

Many of the times, it is incidental diagnosis with the radiological workup when subjected in

suspicion of acute appendicitis. Nearly 40% of the patients will not show leukocytosis or any other abnormal biochemical parameters. Ultrasound abdomen is the initial tool that can pick up the lesion which shows a hyper echoic mass mainly in the right side of the abdomen with a normal appendix<sup>2,21</sup>. Disadvantage of it is operator dependent and chances of missing the lesion are high and though it is specific the sensitivity in the diagnosis of omental infarction is low<sup>22</sup>.

The CT scan is the gold standard and very accurate for the diagnosis of omental infarct. The most common finding is a triangular or oval or cakelike heterogeneous fatty mass with mixed attenuation located between the anterior abdominal wall and the transverse or ascending colon with surrounding inflammatory changes<sup>23</sup>.

### **Management**

Either omental infarction is diagnosed intra operatively when surgery is planned for appendicitis or it is diagnosed prior, where later is least common. Decades back, treatment was controversial as both conservative and surgical modalities were tried with good results in its own centres. In most patients segmental omental infarction is a self-limited, benign condition that may resolve spontaneously. But in recent years, observations and literature review clearly directs towards surgical treatment with the advantages of early clinical symptoms improvement, least amount of analgesic administration and least complications<sup>3,4</sup>.

Laparoscopic technique is the best advocated with the complete removal of infarcted areas of omentum after thoroughly inspecting other inflammatory lesions. When not treated surgically, the inflammatory response resolves with retraction and fibrosis leading to either complete healing or autoamputation<sup>13,24</sup>. Reported complications include adhesions with bowel obstruction and abscess formation.

### Conclusion

This is a rare acute abdominal lesion characterized primarily by pain and the physical findings of peritoneal irritation in the right side of the abdomen. It is frequently mistaken for acute appendicitis or cholecystitis. Obesity has been a major predisposing factor and also rises in the incidence among pediatric age group. CT scan remains the gold standard tool to diagnose followed by early surgical treatment using laparoscopic technique. Research work on the natural history of the disease with more stress on etiology must take place to avoid unnecessary delay in the treatment.

### References

1. R.H. Rich, R.M. Filler; Segmental infarction of the greater omentum: a cause of acute abdomen in childhood; *Can J Surg*, 28 (1983), pp. 241–243.
2. A.C. Fragoso, J.M. Pereira, J. Estevão-Costa; Nonoperative management of omental infarction: a case report in a child; *J Pediatr Surg*, 41 (2006), pp. 1777–1779.
3. B. Lugo, S. Emil ;Omental torsion ;*J Pediatr Surg*, 41 (2006), pp. 458–459
4. R. Jeganathan, E. Epanomeritakis, T. Diamond; Primary torsion of the omentum; *Ulster Med J*, 71 (2002), pp. 76–77.
5. Bush, P.: A Case of Haemorrhage into the Greater Omentum. *Lancet*, 1:286, 1896.
6. Eberts, E. M.: Case of Spontaneous Haemorrhage from the Greater Omentum. *Canadian Med. Assoc. J.*, 10:461, 1920.
7. Johnson, A. H.: The Greater Omentum and Omental Thrombosis. *Northwest Med.*, 31: 285, 1932.
8. Maclean DA. Primary torsion of the omentum in children. *J R Coll Surg Edinb* 1977; 22:430-432.
9. Wengert PA Jr, Azizkhan RG. Primary idiopathic segmental infarction of the greater omentum. *J Pediatr* 1970; 77:459-460.
10. Anton, J. I., Jennings, J. E. and Spiegel, M. B.: Primary Omental Torsion. *Amer. J. Surg.*, 68:303, 1945.
11. Draper, J. W. and Johnson, R. K.: Observations on the Pathological Physiology of the Omentum and Duodenum. *Amer. J. of Surg.*, 12:105, 1931.
12. Hertzler, A. E.: *Surgical Pathology of the Peritoneum*, Philadelphia, 1935, J. B. Lippincott Company.
13. Puylaert JB. Right-sided segmental infarction of the omentum: clinical, US, and CT findings. *Radiology* 1992; 185:169-172
14. MJ Leitner; Torsion, infarction, and hemorrhage of the omentum as a cause of acute abdominal distress; *Ann Surg*, 135 (1952), pp. 103–110.
15. PG Shields, KH Chase; Primary torsion of the omentum in a jackhammer operator: another vibration-related injury; *J Occup Med*, 30 (1988), pp. 892–894.
16. Wresinski, J. T., Firestone, S. D. and Walske, B. R.: Primary Idiopathic Segmental Infarction of the Greater Omentum. *Surg.*, 39:663, 1956.
17. JT Adams; Primary torsion of the omentum; *Am J Surg*, 126 (1973), pp. 102–105.
18. PL Schnur, DC McIbrath, JA Carney, LD Whittaker ; Segmental infarction of the greater omentum ; *Mayo Clinic Proc*, 47 (1972), pp. 751–755.
19. CP Kimber, P Westmore, JM Huston, JH Kelly ; Primary omental torsion in children ; *J Pediatr Child Health*, 32 (1996), pp. 22–24.
20. JBCM Puylaert; Right-sided segmental infarction of the omentum: clinical, US, and CT findings; *Radiology*, 185 (1992), pp. 169–172.
21. A.J. Montiel-Jarquín, M. Sanabria, J.G. Sánchez-Turati, *et al.* ; Vascular pathology

- of the greater omentum ;Eur J Gen Med, 1 (2004), pp. 45–48.
22. Schlesinger AE, Dorfman SR, Braverman RM. Sonographic appearance of omental infarction in children. *Pediatr Radiol* 1999; 29:598-601
  23. A.K. Singh, D.A. Gervais, P. Lee, *et al.*; Omental infarct: CT imaging features; *Abdom Imaging*, 31 (2006), pp. 549–554.
  24. Stella DL, Schelleman TG. Segmental infarction of the omentum secondary to torsion: sonography and computed tomography diagnosis. *Australas Radiol* 2000; 44:212-215.
  25. Balthazar EJ, Lefkowitz RA. Left-sided omental infarction with associated omental abscess: CT diagnosis. *J Comput Assist Tomogr* 1993; 17:379-381.