Left Gastric Artery Embolization In Management of Obesity for Hepatic Patients

Essay

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By

Osama Mohamed Mohamed Hassan Abuelsalheen

MB, BCh

Faculty of Medicine, Ain Shams University

Under Supervision of

Prof. Dr. Mohamed El Ghareeb Abo El Maaty El Zeiny

Professor of Radiology

Faculty of Medicine, Ain Shams University

Dr. Amr Mohammed Ismaeel Saadawy

Lecturer of Radiology

Faculty of Medicine, Ain Shams University

Dr. Mohamed Hosni Kamel Abdelmaksoud

Lecturer of Interventional Radiology

Theodore Bilharz research institute

Visiting Scholar, Interventional Radiology

Stanford University, CA, USA

Faculty of Medicine

Ain Shams University

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Osama Mohamed Mohamed

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List of Abbreviations

Abb.	Full term
AgRP	*Agouti related peptide*
BAH	*Bleomycin A5 hydrochloride*
BCAA	*Branched chain amino acids*
BMI	*Body Mass Index*
CCK	*Cholecystokinin*
EGD	*Esophago Gastro Duodenoscopy*
GERD	*Gastro-esophageal reflux disease*
GOAT	*Ghrelin O Acyl Transferase*
IL-6	*Interleukin-6*
MCP-1	*Monocyte chemo-attractant protein-1*
MEN 2	*Multiple endocrine neoplasia type 2*
NAFLD	*Nonalcoholic fatty liver disease*
NASH	*Non-alcoholic steatohepatitis*
NPY	*Neuropeptide-Y*
POMC	*Pro-opiomelanocortin*
TNF-a	*Tumor necrosis factor-a*

ABSTRACT

Preliminary results of BAE studies are promising and have proven that it has the potential to reach the efficacy of bariatric surgery. The procedure is safe and effective in the short and intermediate terms causing substantial weight loss with minimal related complications. Yet, all the mentioned studies are Phase 1 pilot studies. Further randomized control trials are needed to prove its long term safety, durability (possible upregulation of Ghrelin levels on the long term) and to assess the role of mental and emotional component on food consumption and weight loss in the candidates. Future plans should be directed towards improving the effectiveness of the procedure, defining the most suitable candidates for the procedure and exploring the possibility of using alternative embolic agents. Increasing experience and awareness about radial access should also be considered as a safer alternative for obese patients.

Keywords: *Branched chain amino acids - Monocyte chemo-attractant protein-1- Neuropeptide-Y*

INTRODUCTION

In 1997, the World Health Organization designated obesity as a global epidemic, marking the first time in history that a non-infectious disease has been labeled as an epidemic ***(Caballero et al., 2007).***

Obesity is directly associated with increased risk of several co-morbidities, including diabetes, cardiovascular disease (ie, heart disease and stroke), endometrial cancer, breast cancer, colon cancer, sleep apnea, and osteoarthritis ***(Flegal et al., 2010).***

Obesity has been directly related to liver cirrhosis as a cause for Non-alcoholic steatohepatitis (NASH). Moreover, it can exacerbate co-existing liver injury which negatively affects the prognosis of the disease. Obesity also makes liver transplantation difficult especially in the living donor which needs low graft to recipient ratio ***(Kumar et al., 2015).***

Multiple options are available for obesity management including dietary and lifestyle modifications, which can result in modest degrees of weight loss that is hard to maintain on the long term ***(Aronne et al., 2009).*** Pharmacological modulation of hunger can achieve only modest levels of weight loss ***(Cummings et al., 2003).*** Bariatric surgery has proven to result in substantial degrees of sustained weight loss, especially the Roux-en-Y

operation, but the surgical risk and post-operative complications in obese patients are significant ***(Schindler et al., 2004).***

Left gastric artery embolization is a new technique that has demonstrated promising preliminary data in animals and humans. Multiple studies have been carried to evaluate left gastric artery embolization for weight loss. They revealed promising results with significant subcutaneous fat loss ***(Arepally et al., 2007; Bawudun et al., 2012).***

Many cirrhotic patients are denied their chance in liver transplantation because of excess weight. Left gastric artery embolization brings a new hope for these patients to be back on transplantation lists via a minimally invasive procedure and limited post-operative morbidity and mortality ***(Kumar et al., 2015).***

AIM OF THE WORK

The aim of the study is to evaluate the technical feasibility, safety and efficacy of gastric artery embolization as a minimally-invasive image-guided procedure for morbidly obese hepatic patients.

ANATOMICAL CONSIDERATIONS

I. Gross anatomy:

The stomach is a distensible J shaped structure which lies mainly in the left hypochondrial region, with its lower and distal parts lying in the epigastric and upper umbilical regions. It has an average capacity of 1.5 liters in adults. It has two surfaces, anterior and posterior, separated from each other by the lesser and greater curvatures. It also has two openings, the proximal one at the cardiac orifice which communicates with the esophagus, and the distal one at the pyloric orifice situated at the gastroduodenal junction ***(Mahavedan, 2014).***

The stomach consists of 3 main parts namely the fundus, the body and the pylorus. The fundus is the part above the cardiac orifice. The other two parts are separated by a small notch along the lesser curvature named " the incisura angularis". The body extends from the cardiac orifice to the level of the incisura angularis while the pylorus extends from the latter level to the gastroduodenal junction ***(Mahavedan, 2014).***

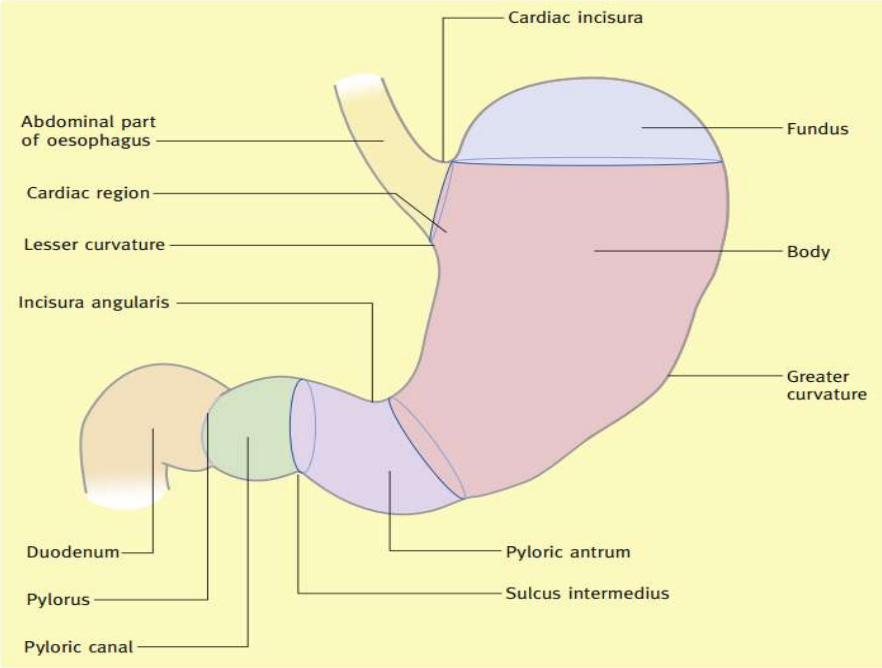

Figure (1): Displaying different parts of the stomach ***(Mahavedan, 2014).***

II. Vascular anatomy of the stomach:

The blood supply of the stomach is entirely supplied by the celiac trunk through its three main branches, the left gastric artery, the splenic artery and the common hepatic artery. They form two arterial arcades along the lesser and greater curvatures of the stomach. The lesser curvature arcade is formed by the anastomosis of the left gastric and right gastric arteries. The greater curvature arcade is formed by the anastomosis of the right and left gastroepiploic arteries ***(Atlas of vascular anatomy: an angiographic approach 2nd edition, 2007).***

1. ***Left gastric artery:***

Arises as one of the three main branches of the celiac trunk or may arise directly from the aorta. It passes superiorly along the left side of the stomach to give esophageal branches, then passes inferiorly along the lesser curvature of the stomach to anastomose with the right gastric artery both supplying the anterior and posterior surfaces of the stomach.

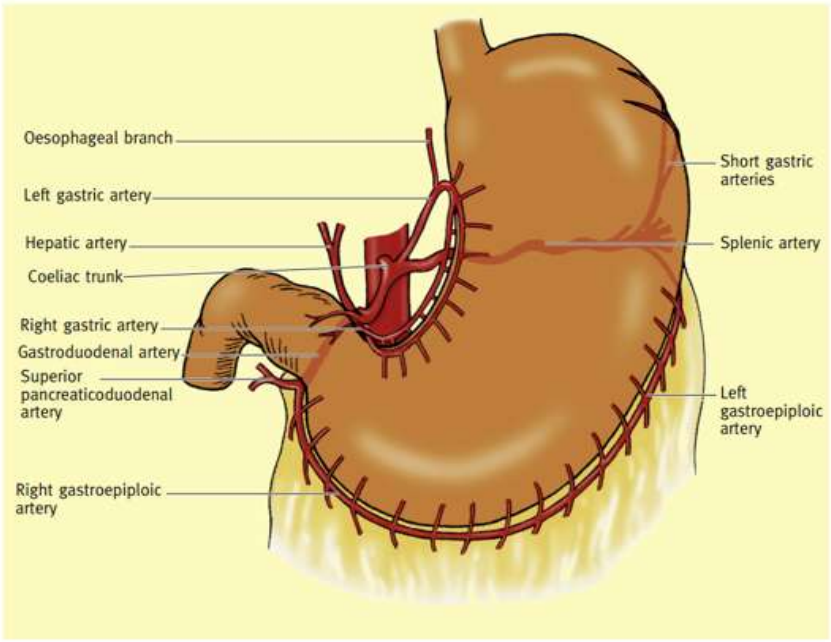

Figure (2): Arterial supply of the stomach ***(Mahavedan, 2014).***

2. Right gastric artery:

Originates most commonly from the hepatic artery proper or less frequently from the common hepatic artery. It anastomoses with the left gastric artery along the lesser curvature of the stomach.

3. Right gastroepiploic artery:

It is the terminal branch of the gastroduodenal artery; it passes along the greater curvature of the stomach to finally anastomose with the left gastroepiploic artery. It gives ascending pyloric branch as well as ascending gastric branches which anastomose with the descending branches of the left and right gastric arteries.

4. Left gastroepiploic artery:

Arises from the splenic artery, it runs along the greater curvature of stomach to anastomose with the right gastroepiploic artery. It gives anterior and posterior short gastric arteries which supply the gastric body and antrum.

5. Short gastric arteries:

Arise from the splenic artery, variable in number from one to four arteries and up to nine arteries. They anastomose with other gastric arteries and supply the proximal part of the greater curvature.

6. ***Posterior gastric artery:***

Arises from the splenic artery and supplies the posterior fundic portion of the stomach ***(Atlas of vascular anatomy: an angiographic approach 2nd edition, 2007).***

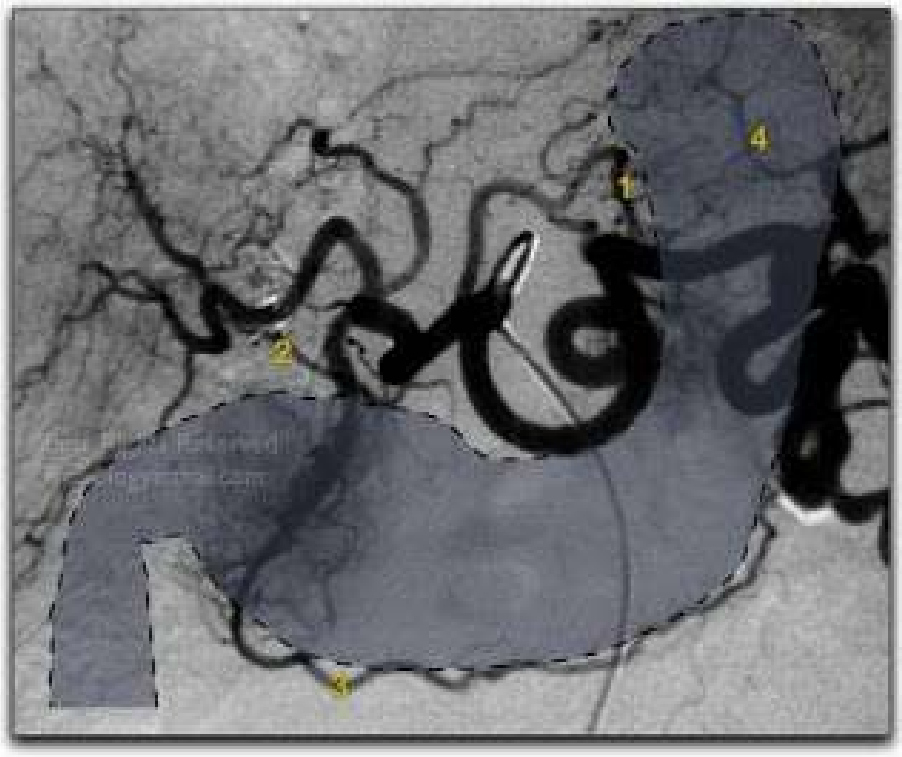

Figure (3): DSA image displaying arterial supply of the stomach. 1) Left gastric artery 2) Right gastric artery 3) Right gastro-epiploic 4) Short gastric arteries (http://www.ritradiology.com)