Left Gastric Artery embolization for obesity management – Current experiences and techniques

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DISCLOSURES

Consultant/Medical Advisory Board

Abbott
BSCI
Cardinal Health/Cordis
Cook Medical
CR BARD/Becton Dickinson
CSI
Endologix

• Inari
• Medtronic
• Micro Medical Solutions
• Philips/Volcano/Spectranetics
• Penumbra
• Terumo/Bolton
• WL Gore
Gastric Artery Embolization

Worldwide Epidemic

USA, China and India

High Health system costs

Bariatric Surgery - High Morbidity

Lack of alternatives

NOTES: Age-adjusted by the direct method to the year 2000 U.S. Census Bureau estimates using age groups 20–39, 40–59, and 60–74. Overweight is body mass index (BMI) of 25 kg/m² or greater but less than 30 kg/m²; obesity is BMI greater than or equal to 30; and extreme obesity is BMI greater than or equal to 40. Pregnant females were excluded from the analysis.

SOURCES: NCHS, National Health Examination Survey and National Health and Nutrition Examination Surveys.
Obesity Epidemic

https://stateofobesity.org/adult-obesity/
Medical Complications of Obesity

US Obesity-related healthcare costs:

$147 billion – $210 billion per year

https://stateofobesity.org/adult-obesity/
Treatment Modalities

Pharmacotherapy

- Lorcanarin
- Phentermine
- Phentermine / Topiramate
- Bupropion / Naltrexone
- Orlistat
- Liraglutide

Endoscopic Weight Loss

- Space-occupying
- Restrictive
- Bypass Line
- Aspiration Device
- Stimulator
Bariatric Surgery

https://www.news-medical.net/health/Bariatric-Surgery-Types.aspx
Evidence-Based Guidelines

Bariatric Surgery Eligibility

Table 2
NIH Guidelines for Patient Selection for Bariatric Surgery

- ≥100 lb. excess weight
- BMI ≥40 kg/m² without obesity-associated comorbidities (e.g., diabetes, cardiovascular disease, arthritis, obstructive sleep apnea)
- BMI 35.0-39.9 kg/m² with 1 or more associated medical problems
- Previous failed weight-loss attempts (e.g., nonsurgical interventions: diet control, behavioral modification, exercise)


Morbidly obese patients that strongly oppose surgical procedures?

BMI 30.0-34.9
Patients would like to try alternative therapy?
What can fill these treatment gaps?

...Too Risky for Many Patients...

http://slideplayer.com/slide/105864/20/
Gastric Artery Embolization: GAE

LEFT GASTRIC ARTERY EMBOLIZATION

http://pardisnoor.com/clinics%20detail?id=-505071861
GAE: How does it work?

All bariatric surgeries effectively isolate fundal Ghrelin-producing cells

GAE: Procedure

Two patients who underwent left gastric artery (LGA) embolization. (Presented in poster format at Image-Guided Intervention: 50th Anniversary meeting in Portland, OR, July 23–24, 2014)
GAE: Early human data

- Retrospective
- UGIB patients
- LGA embolized (fundus)
  - N = 19
- Non-LGA embolized
  - N = 28

3 month TWL:
- LGA embo = 7.3%
- Controls = 2% TWL

A preliminary observation of weight loss following left gastric artery embolization in humans.

Quinn AJ\(^1\), Oklu R\(^2\).
GAE: Clinical trial evidence

JACC: Cardiovascular Interventions
Volume 8, Issue 12, October 2015, Pages 1641-1644

Letter to the Editor

Endovascular Bariatrics: First in Humans Study of Gastric Artery Embolization for Weight Loss
Nickolas Kipshidze MD, PhD, Akaki Archvadze MD, Stefan Bertog MD, Martin B. Leon MD, Horst Sievert MD

Original Research
Vascular and Interventional Radiology

Clinical Safety of Bariatric Arterial Embolization: Preliminary Results of the BEAT Obesity Trial

Author List
Clifford R. Weias, MD, Olagueoke Akinwande, MD, Kaylan Paudel, MD, Lawrence J. Cheskin, MD, Brian Holty, MD, Kelvin Hong, MD, Aaron M. Fischman, MD, Rahul S. Patei, MD, Eun J. Shin, MD, Kimberley E. Steele, MD, PhD, Timothy H. Moran, PhD, Kristen Kaiser, Annie Park, BS, David M. Shade, JD, Dara L. Kraitchman, VMD, PhD, Aravind Arepally, MD

Original Contributions

Bariatric Embolization of the Left Gastric Arteries for the Treatment of Obesity: 9-Month Data in 5 Patients
Zhi-Bin Bai, Yong-Lin Qin, Gang Deng, Guo-Feng Zhao, Bin-Yan Zhong, Gao-Jun Teng
# GAE: The Clinical Trial Evidence

## Table 1. Characteristics and Results of the Available Prospective Clinical Trials

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Embolic Agent</th>
<th>Embolic Size (μm)</th>
<th>Follow-Up (mo)</th>
<th>Primary Endpoint</th>
<th>Adverse Events</th>
<th>Mean Baseline BMI (kg/m²)</th>
<th>Absolute Weight Loss</th>
<th>Excess Weight Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kipshidze et al[^34]</td>
<td>5</td>
<td>Bead Block particles</td>
<td>300–500</td>
<td>24</td>
<td>Weight loss</td>
<td>Mild transient epigastric discomfort</td>
<td>42.2</td>
<td>17.2%</td>
<td>Unknown</td>
</tr>
<tr>
<td>Syed et al[^35]</td>
<td>4</td>
<td>Bead Block particles</td>
<td>300–500</td>
<td>6</td>
<td>Safety</td>
<td>Mild nausea, occasional vomiting, mild epigastric discomfort</td>
<td>42.4</td>
<td>7.8%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Weiss et al[^36]</td>
<td>5</td>
<td>Embosphere microspheres</td>
<td>300–500</td>
<td>3</td>
<td>30-day adverse events</td>
<td>Transient pancreatitis, asymptomatic superficial ulcer</td>
<td>43.8</td>
<td>4.7%</td>
<td>9%</td>
</tr>
<tr>
<td>Bai et al[^37]</td>
<td>5</td>
<td>PVA particles</td>
<td>500–710</td>
<td>9</td>
<td>Safety</td>
<td>Superficial linear ulceration, hematoma at puncture site</td>
<td>38.1</td>
<td>Unknown</td>
<td>12.64%</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index; PVA, polyvinyl alcohol.
Systematic Review of articles through 2017

→ 62 patients
  → 53 Obese (BMI >= 30)
  → 9 Morbidly Obese (BMI >= 40)
Followup

BMI ↓ (1-3 Months)
- 7% Obese
- 11% Morbidly Obese

BMI ↓ (1 Year)
2% BMI decrease in both groups
Results

Ghrelin (⅘)

↓ 36% in 3 Months

Hemoglobin A1c

↓ 7.4% - 6.3% at 6 months

Improved Quality of Life (SF-36)
New Developments

LABORATORY INVESTIGATION

Bariatric Radioembolization: A Pilot Study on Technical Feasibility and Safety in a Porcine Model

Alexander S. Pasciak, PhD, Austin C. Bourgeois, MD, Ben E. Paxton, MD, Laurentia Nodit, MD, Patricia N. Coan, DVM, PhD, Dara Kraitchman, DVM, PhD, Sandra S. Stinnett, PhD, Vijay M. Patel, MD, Yingli Fu, PhD, Joleen K. Adams, DVM, M. Katherine Tolbert, DVM, PhD, Cassie N. Lux, DVM, Aravind Arepally, MD, and Yong C. Bradley, MD
Bariatric Radioembolization

Pigs treated with y90 gained significantly less weight than the placebo (saline) -treated pigs.
GAE: Summary

• Gastric Embolization with 300-500micron spheres in severely obese patients
  – Appears Safe + Effective in short and intermediate term

• Moving Forward
  – Need placebo-controlled trial
  – Need longer term follow up
  – Ancillary Effects:
    • Effect on future bypass?

https://www.medicalnewstoday.com/articles/317442.php
Conclusions

➔ LGA embolization therapy has insufficient data to alter practice (Grade C, Level 3 of evidence according to Kordzadeh, et al.).

➔ Obesity treatment must have a multidisciplinary approach.

➔ Psychologist, dietician and physical therapist must work together to sustain and enhance the results of any procedure.

➔ Bariatric alternatives may have a place in the Interventionalist Practice if done as part of an integrative approach.
Where do we go from here?

- Development of clinical trials with multidisciplinary approach and long-term follow up
- Placebo-controlled trials
- Possibly combine with antiobesity medication treatment.
References

MSMC Multi-Disciplinary Peripheral Team

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Students are welcome to rotate with us.

@SOBE_Vascular #CLIFighters
THANK YOU!
Left Gastric Artery embolization for obesity management – Current experiences and techniques

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