

Incremental Cost Effectiveness of Aspiration Therapy vs. Bariatric Surgery and No Treatment for Morbid Obesity

Hai V. Nguyen

School of Pharmacy, Memorial University of Newfoundland

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Obesity Epidemic

- 1 in 4 Canadians obese, over 1.5 million morbidly obese (BMI > 35)
- Healthcare cost of obesity \$4.6 - \$7.1 billion a year

Treatments for morbid obesity:

- Diet & Exercise (Weight Watchers, Jenny Craig)
- Pharmacotherapy (Orlistat, Liraglutide, Lorcaserin)
- Bariatric surgery (Gastric Bypass, Sleeve Gastrectomy)

Bariatric Surgery: Access & Wait times in Canada

- Only **1 in 183** eligible patients get surgery in a given year
- **Wait times longest of any surgically treatable condition**

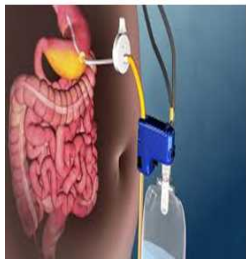
Grading Wait Times for Bariatric Surgery

Provinces	Waiting Time between Referral and Consultation	Grade	Waiting Time between Consultation and Surgery	Grade
Newfoundland and Labrador	24 months	F	12 months	C
Nova Scotia	60 months	F	Six months	B
New Brunswick	More than 36 months	F	12 months	C
Québec	24 months	F	Six to 12 months	B
Ontario	Referral to the Medical Program: up to 24 months	F	Six to 12 months	B
Manitoba	48 months	F	12 months	C
Saskatchewan	24 months	F	Six months	B
Alberta	18 to 24 months	F	More than 12 months	C
British Columbia	24 months	F	Six to 12 months	B

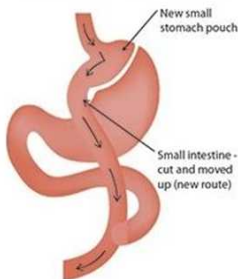
Source: Canadian Obesity Network-Réseau canadien en obésité. Report Card on Access to Obesity Treatment for Adults in Canada 2017. Edmonton, AB: Canadian Obesity Network Inc.; 2017, April.

Aspiration Therapy and Bariatric Surgery: A Comparison

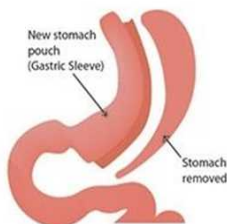
Aspiration Therapy



Gastric Bypass



Sleeve Gastrectomy



Aspiration therapy approved by FDA in 2016 & Health Canada in 2017

- Two parts (Internal tube + External device)
- Patient aspirates 20-30 min after meal
- Caloric absorption ↓ by up to 30%

Aspiration Therapy Highly Controversial



Why a draconian weight-loss device may help solve a complex issue

CARLY WEEKS >
PUBLISHED JULY 10, 2016
UPDATED MAY 16, 2018

COMMENTS

It sounds too outlandish to be true: a weight-loss device that uses a tube surgically implanted in the stomach to pump out the contents of a meal minutes after eating. But the device, called AspireAssist, is most definitely real. It was approved last month by the U.S. Food and Drug Administration and could hit the market in Canada soon.



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REPORT · SCIENCE · REVIEW

Latest weight-loss device approved by the FDA leaves some doctors 'appalled'

AspireAssist lets people with obesity pump food out of their stomachs

By Alexandra Polanco | @ale_polanco | Jun 21, 2016, 9:15am EDT

A weight-loss device [approved](#) by the FDA last week has some doctors up in arms, with one even attempting to put together 4,000 physicians to sue the agency. That's because they say the device, which lets patients pump some of the food they've just eaten directly from their stomachs into the toilet, isn't safe and may lead to eating disorders.

"This is the first time that I look at a device that was approved by the FDA and I am absolutely, utterly, and totally appalled that it was approved," says Joseph Gutman, an endocrinologist and diabetologist in Pembroke Pines, Florida, who has treated patients with

"I AM ABSOLUTELY, UTTERLY, AND TOTALLY APPALLED THAT IT WAS APPROVED"

"A weight-loss device approved by the FDA last week has some doctors up in arms, with one even attempting to put together 4,000 physicians to sue the agency. That's because they say the device isn't safe and may lead to eating disorders."

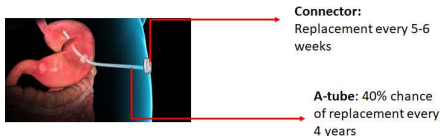
Debate only focuses on clinical aspects, no evidence on cost-effectiveness

- Is aspiration therapy cost-effective vs. bariatric surgery?
- Is aspiration therapy cost-effective vs. no treatment?

Advantages & Limitations of Aspiration Therapy

(+) Outpatient procedure - low initial cost - faster recovery, complications less severe

(-) High maintenance costs

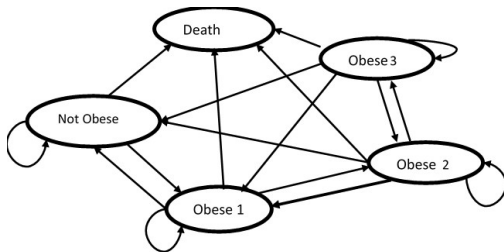


(-) Lower weight loss effects than bariatric surgery

(-) High discontinuation rates – 47% in 4 years (Nystrom et al. 2018)

The Markov Model

- Hypothetical cohort 22-74 years , BMI: 35-55
- 4 strategies: Aspiration Therapy, Gastric Bypass, Sleeve Gastrectomy, No Treatment
- Health System Perspective, Lifetime horizon
- 5 Health States



The Model Explained

No treatment or Aspiration Therapy / Bariatric surgery in year 1

Risk of short and/or long-term complications and death

Some patients may discontinue aspiration therapy

Each year after year 1, experience weight loss/gain, move across BMI states

Costs & QALYs estimated for each cycle, summed over lifetime

Model Inputs: Weight loss & Discontinuation

Variable	Aspiration therapy	Gastric Bypass	Sleeve Gastrectomy
Percent Excess Weight Loss			
Year 1	46.3	63.3	51.5
Year 2	48.2	80.1	46.7
Year 3	50.3	76.3	59.4
Year 4	47.9	76.4	59.4
Year 5	47.9	64.9	59.4
Probability of treatment discontinuation	0.09; 0.15; 0.12; 0.11	0	0

Smaller than bariatric surgeries



High discontinuation rates



Model Inputs: Costs

Variables	Aspiration Therapy	Gastric Bypass	Sleeve Gastrectomy
Initial procedure	10,000	28,465	24,786
Procedure reversal	2500		
A-tube replacement	5000		
External connector (per year beyond year 1)	800		
Follow up visits	0, 608	760, 456, 304	760, 304, 152
Dietary Supplements		94	
Complications			
Short run major complication	882	46562	46562
Short run minor complication	50	1428	1428
Long run major complication	9000	51266	51266
Long run minor complication	50	895	895
Annual health care costs			
Not Obese		3909	
Obese 1		4596	
Obese 2		5408	
Obese 3		6587	

Cheaper upfront but high maintenance costs

Lower cost of managing complications

Model Inputs: Utilities

Variable	Aspiration therapy	Gastric Bypass	Sleeve Gastrectomy			
BMI Specific Utilities						
	Age (years)	22-30	31-40	41-50	61-70	≥ 71
Not Obese		0.91	0.89	0.86	0.81	0.79
Obese 1		0.89	0.86	0.82	0.79	0.76
Obese 2		0.88	0.83	0.79	0.76	0.74
Obese 3		0.84	0.82	0.75	0.71	0.69
Disutility						
Procedure related disutility		0.008			0.025	
Major complication		0.014			0.042	
Minor complication		0.004			0.008	

Lower disutility from procedure and complications

Results

Strategy	Cost (US\$)	Incremental Costs (US\$)	Effectiveness	Incremental Effectiveness	ICER (US\$/QALY)
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I. All strategies

No treatment	117,357	-	12.96	-	-
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Sleeve Gastrectomy	121,459	4,103	15.11	2.15	1,908
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Gastric Bypass	130,914	9,454	15.35	0.23	40,512
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Aspiration Therapy	136,231	5,318	14.04	-1.31	Dominated
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Gastric Bypass most cost-effective

Aspiration therapy dominated by bariatric surgery

II. Aspiration therapy vs. No treatment

No treatment	117,357	0	12.96	0	
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Aspiration Therapy	136,231	18,875	14.04	1.08	17,532
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But, aspiration therapy cost-effective vs. no treatment

Sensitivity Analyses

- **Vary parameter values**
 - Efficacy, maintenance costs, discontinuation rates for aspiration therapy
 - 10-year time horizon instead of lifetime
- **Use alternative data for bariatric surgery**
 - Long-term (8-10) year weight loss effects data
 - Complication risks from another recent, high-quality RCT and two meta-analyses
- **Probabilistic sensitivity analyses**

Base case findings continue to hold

Aspiration therapy cost-effective if no discontinuation & efficacy \uparrow *by* 35%

Summary & Discussion

- Aspiration therapy **dominated by bariatric surgery but cost-effective vs. no treatment**
 - Higher cost \Leftrightarrow higher maintenance costs
 - Lower effectiveness \Leftrightarrow lower weight loss effects + discontinuation
- Yet, aspiration therapy can be of interest to:
 - **Patients:** willing to pay more for lower weight loss but shorter wait time
 - **Policymakers:** keen to reduce wait times for bariatric surgery
- Limitations:
 - Non-RCT, short-term weight loss effects of aspiration therapy
 - Utility from food consumption not captured

THANK YOU!