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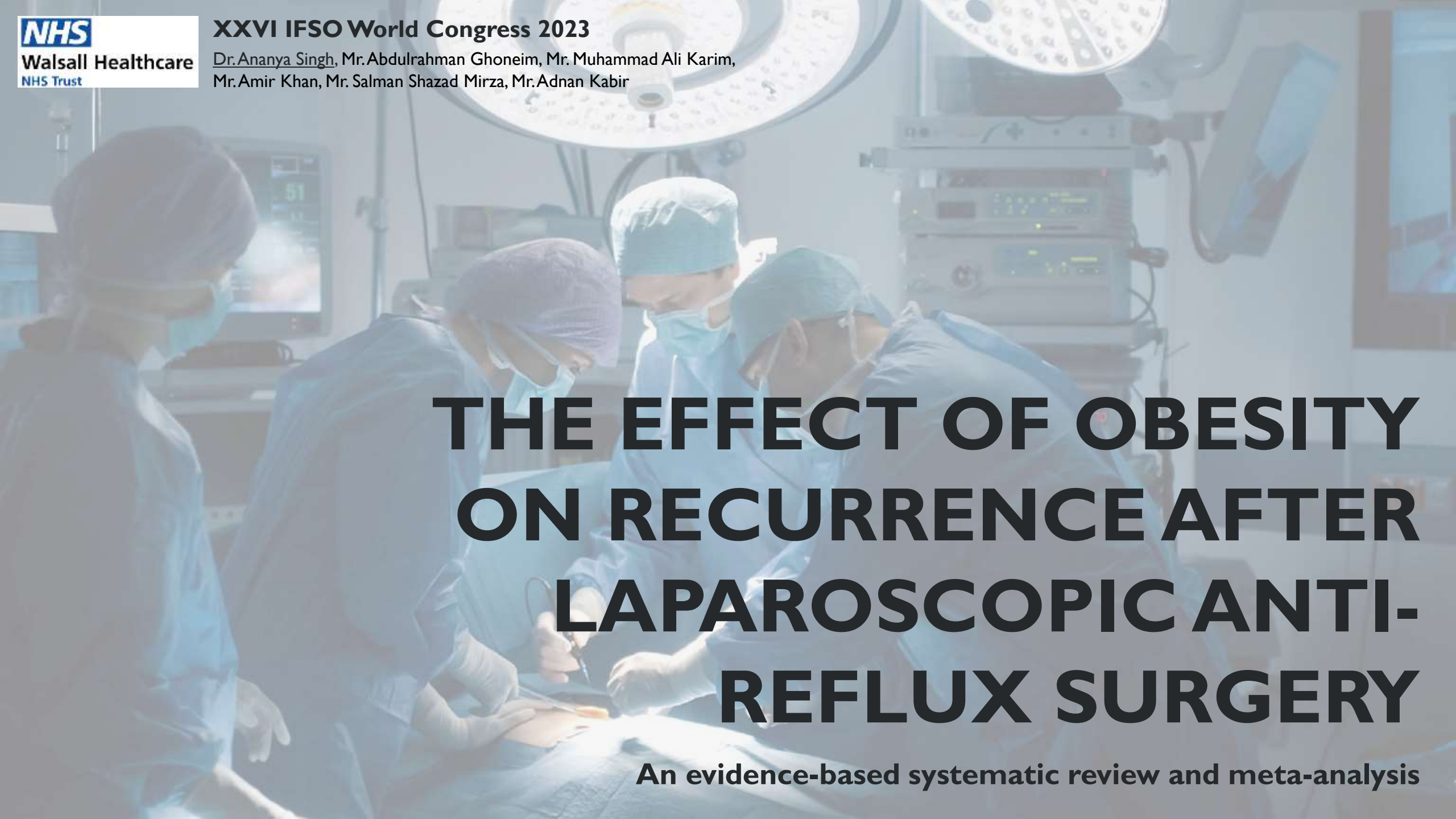


THE EFFECT OF OBESITY ON RECURRENCE AFTER LAPAROSCOPIC ANTI-REFLUX SURGERY

An evidence-based systematic review and meta-analysis

CONFLICT OF INTEREST DISCLOSURE

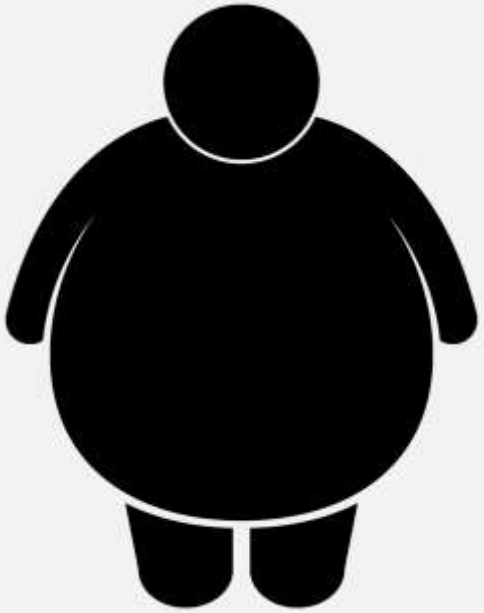
In accordance with EACCME Criteria for the Accreditation of Live Educational Events,

I have no potential conflict of interest to report.

BACKGROUND

Rising prevalence globally, up to 30% prevalence in Western societies[1]

Laparoscopic anti-reflux surgery (LARS) is the gold standard surgical alternative Mx[2,3]



Increasing prevalence of obesity[2]

Obesity is strongly associated with GORD[4,5]

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2. Lundell L. Borderline indications and selection of gastroesophageal reflux disease patients: 'is surgery better than medical therapy'? Dig Dis 2014;32(1e2):152e5.
3. Lundell L, Miettinen P, Myrvold H, Pedersen S, Liedman B, Hatlebakk J, et al. Continued (5-year) followup of a randomized clinical study comparing antireflux surgery and omeprazole in gastroesophageal reflux disease. J Am Coll Surg 2001;192(2):172e9.
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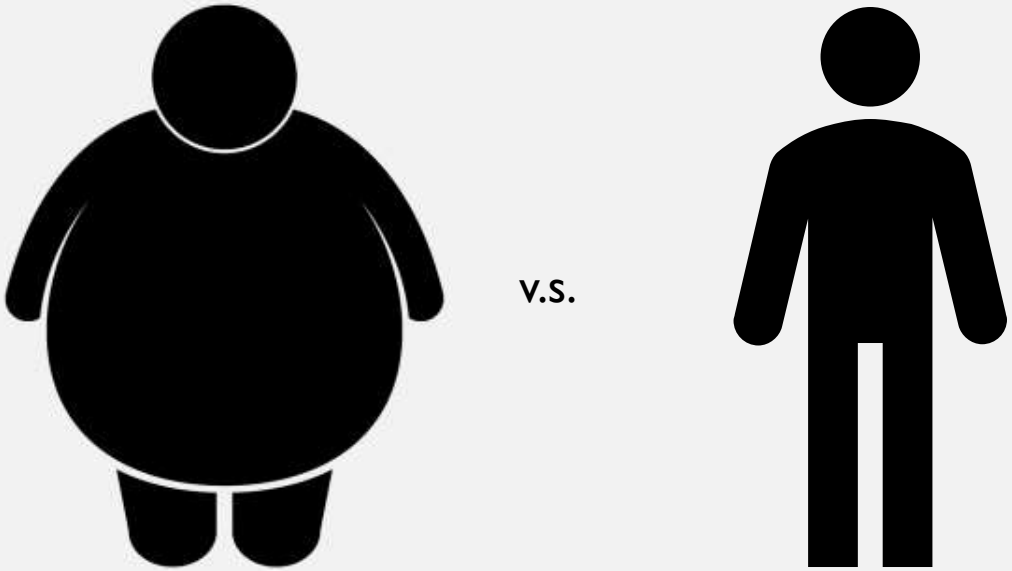
AIMS

Primary Outcome

Recurrence of GORD

- Symptoms
- Quantitative measures (e.g. pH studies, oesophageal manometry)



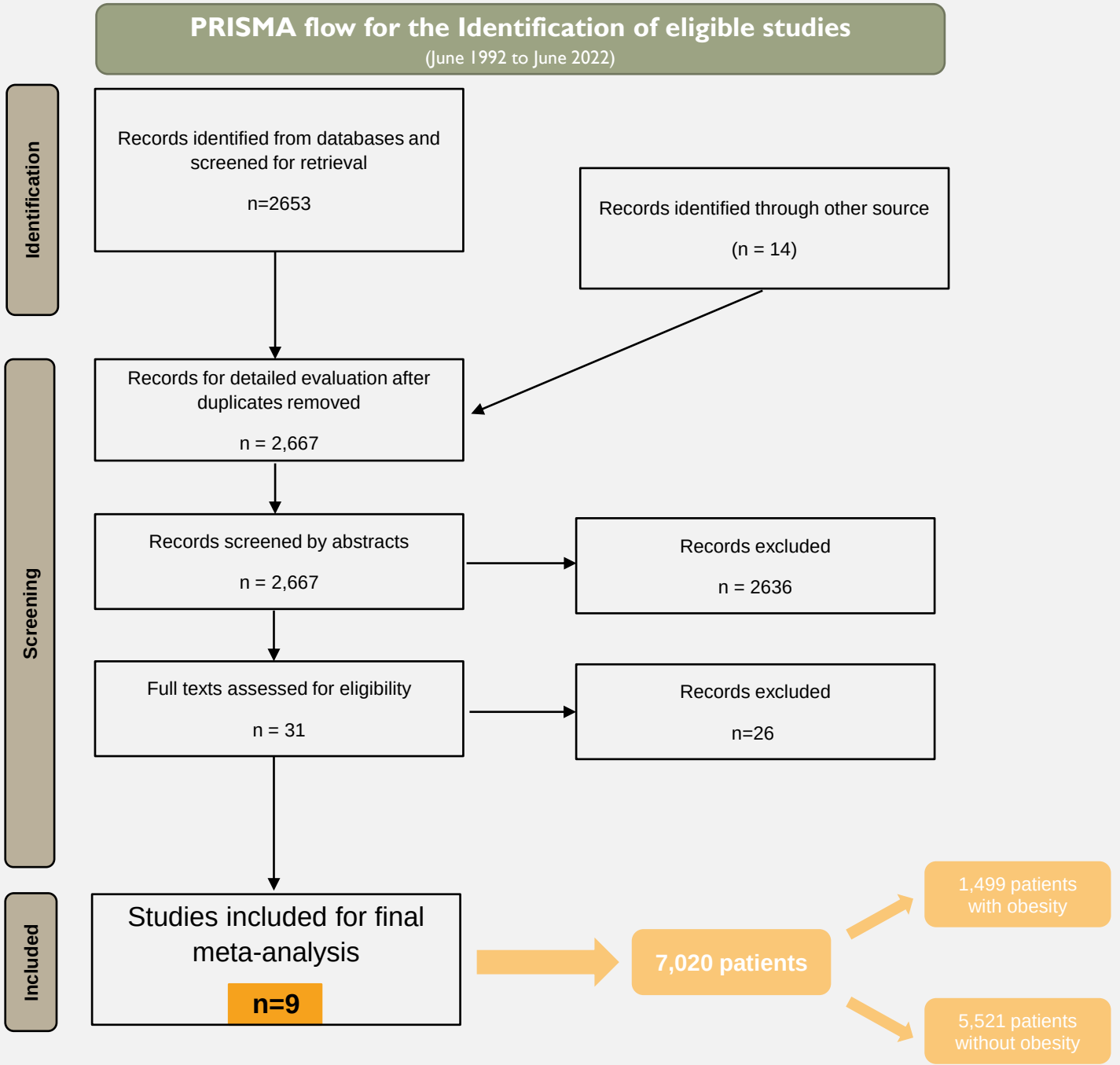
Secondary Outcomes

- Peri-operative complications
- Immediate return to theatres
- Re-do surgery/ re-intervention

METHODS

PICOS	Inclusion and Exclusion criteria
Patient	Inclusion: Patient categorized having obesity by the WHO criteria[6] (BMI ≥ 30), suffering from GORD. Exclusion: Patients under the age of 18
Intervention	Inclusion: Laparoscopic Anti-Reflux Surgery (Lap. Nissen fundoplication, Lap. Toupet, Lap. anterior or any posterior wrap) Exclusion: Redo surgery, Open Surgery, Bariatric procedures.
Comparison	Inclusion: Patient categorized as not having obesity by the WHO criteria (BMI <30), suffering from GORD. Exclusion: Patients under the age of 18 years.
Outcome	Primary outcome: Recurrence Secondary outcome: Incidence of peri-operative complications in the form of re-intervention such as endoscopic dilatation or re-do-surgery, and return to theatre early
Study Design	Inclusion: Randomized controlled trials, controlled trials (eg,. non-randomized, historical controls), Observational studies, and conference proceedings with sufficient data available were included (if it became a full article afterward, it was included then to only to prevent duplication of the data). No restriction of language or region was applied. Exclusion: Animal studies

6. Index BM. Body mass index (BMI). 2015. Retrieved from: http://www.cdc.gov/healthyweight/assessing/bmi/

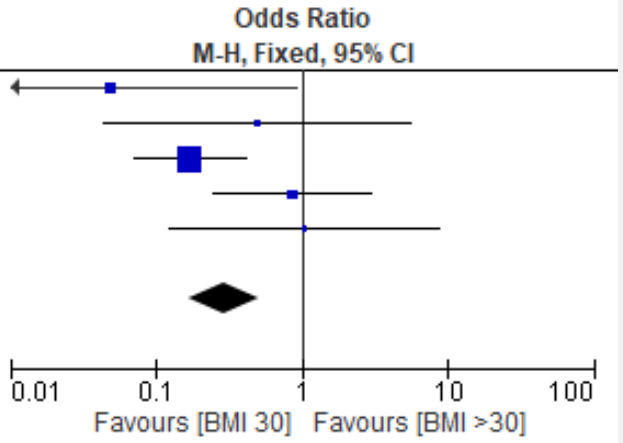

PRISMA flow for the Identification of eligible studies
(June 1992 to June 2022)
Identification
Records identified from databases and screened for retrieval
n=2653
Records identified through other source
(n = 14)
Screening
Records for detailed evaluation after duplicates removed
n = 2,667
Records screened by abstracts
n = 2,667
Records excluded
n = 2636
Full texts assessed for eligibility
n = 31
Records excluded
n=26
Included
Studies included for final meta-analysis
n=9
7,020 patients
1,499 patients with obesity
5,521 patients without obesity

RESULTS – 1° OUTCOME

Study or Subgroup	Experimental (BMI <30) Events	Total	Control (BMI >30) Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI
Andolfi 2017	0	111	5	65	17.6%	0.05 [0.00, 0.91]
Anvari 2005	1	70	2	70	5.0%	0.49 [0.04, 5.56]
Schietroma 2017	8	132	19	69	60.0%	0.17 [0.07, 0.41]
Tekin 2011	17	865	3	132	13.1%	0.86 [0.25, 2.98]
Tsuboi 2009	14	135	1	10	4.3%	1.04 [0.12, 8.84]
Total (95% CI)		**1313**		**346**	**100.0%**	**0.29 [0.17, 0.51]**
Total events	40		30			

Heterogeneity: Chi² = 7.32, df = 4 (P = 0.12); I² = 45%

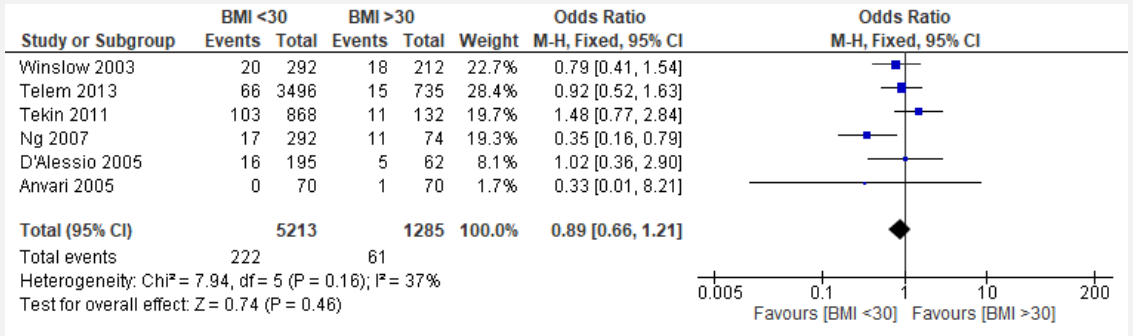
Test for overall effect: Z = 4.26 (P < 0.0001)



- Rate of recurrence of GORD post LARS: **patients with obesity > patients without obesity**
  - 9.50% pooled rate in patients with obesity
  - 3.04% pooled rate in patients without obesity
  - Median follow-up post-op: 35 months
  - **Statistically significant difference**: p value = 0.0001
- Laparoscopic Nissen fundoplication – most common type of LARS

RESULTS – 2° OUTCOMES

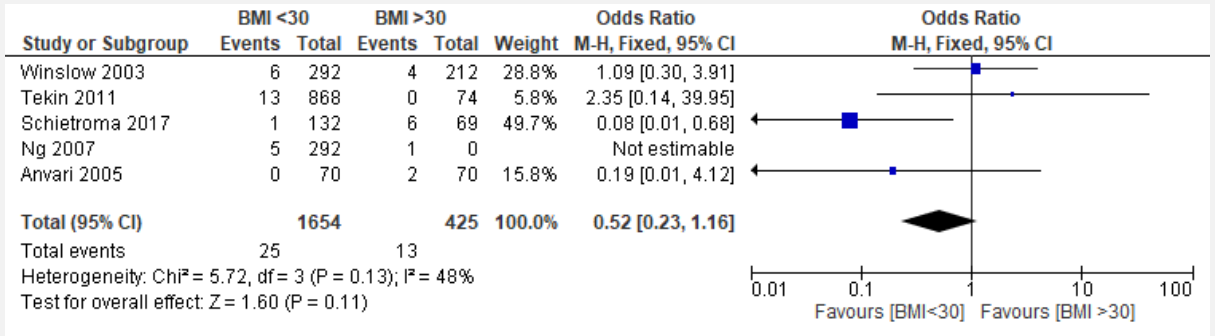
No statistically significant difference



Study or Subgroup	BMI <30 Events	Total	BMI >30 Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI
Winslow 2003	20	292	18	212	22.7%	0.79 [0.41, 1.54]
Telem 2013	66	3496	15	735	28.4%	0.92 [0.52, 1.63]
Tekin 2011	103	868	11	132	19.7%	1.48 [0.77, 2.84]
Ng 2007	17	292	11	74	19.3%	0.35 [0.16, 0.79]
D'Alessio 2005	16	195	5	62	8.1%	1.02 [0.36, 2.90]
Anvari 2005	0	70	1	70	1.7%	0.33 [0.01, 8.21]
Total (95% CI)		**5213**		**1285**	**100.0%**	**0.89 [0.66, 1.21]**
Total events	222		61			

Heterogeneity: Chi² = 7.94, df = 5 (P = 0.16); I² = 37%
Test for overall effect: Z = 0.74 (P = 0.46)

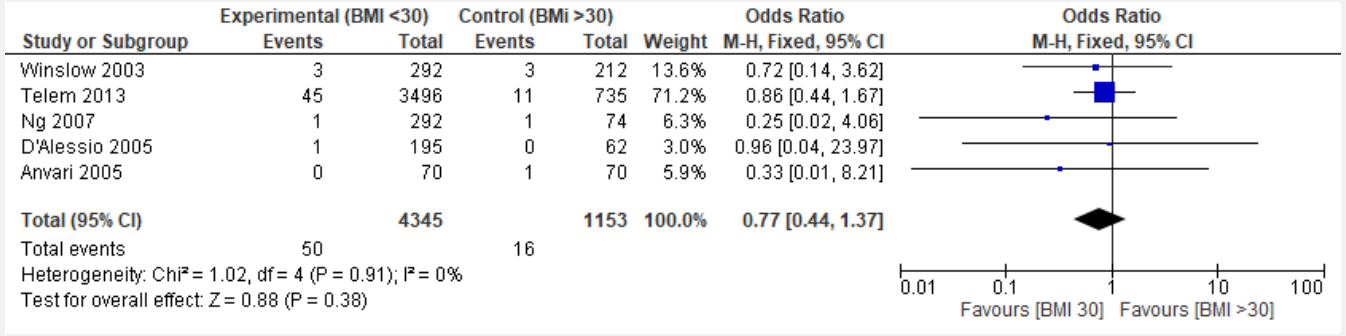
Peri-operative complications



Study or Subgroup	BMI <30 Events	Total	BMI >30 Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI
Winslow 2003	6	292	4	212	28.8%	1.09 [0.30, 3.91]
Tekin 2011	13	868	0	74	5.8%	2.35 [0.14, 39.95]
Schietroma 2017	1	132	6	69	49.7%	0.08 [0.01, 0.68]
Ng 2007	5	292	1	0		Not estimable
Anvari 2005	0	70	2	70	15.8%	0.19 [0.01, 4.12]
Total (95% CI)		**1654**		**425**	**100.0%**	**0.52 [0.23, 1.16]**
Total events	25		13			

Heterogeneity: Chi² = 5.72, df = 3 (P = 0.13); I² = 48%
Test for overall effect: Z = 1.60 (P = 0.11)

Re-intervention/ re-do surgery



Study or Subgroup	Experimental (BMI <30) Events	Total	Control (BMi >30) Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI
Winslow 2003	3	292	3	212	13.6%	0.72 [0.14, 3.62]
Telem 2013	45	3496	11	735	71.2%	0.86 [0.44, 1.67]
Ng 2007	1	292	1	74	6.3%	0.25 [0.02, 4.06]
D'Alessio 2005	1	195	0	62	3.0%	0.96 [0.04, 23.97]
Anvari 2005	0	70	1	70	5.9%	0.33 [0.01, 8.21]
Total (95% CI)		**4345**		**1153**	**100.0%**	**0.77 [0.44, 1.37]**
Total events	50		16			

Heterogeneity: Chi² = 1.02, df = 4 (P = 0.91); I² = 0%
Test for overall effect: Z = 0.88 (P = 0.38)

Early return to theatre

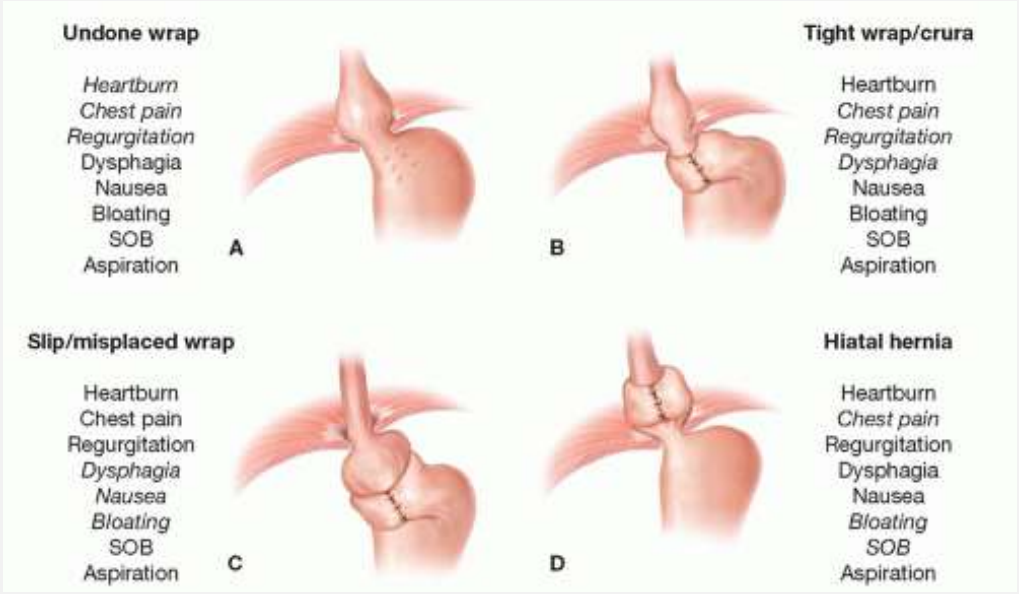
CONCLUSION

Rate of recurrence of GORD post LARS:

Patients with obesity > patients without obesity

($p = 0.0001$)

∴ Obesity increases the risk of recurrence of GORD post LARS



No statistically significant difference in the secondary outcomes

WIDER IMPACT

Obesity is a risk factor for the recurrence of GORD post LARS

Consider risks v.s. benefits

Weight reduction strategies should be advised prior to LARS

FURTHER RESEARCH

How to decrease risk of recurrence of GORD in patients with obesity?

Weight loss[7]

Weight loss has an independent beneficial effect on symptoms of gastro-oesophageal reflux in patients who are overweight

C A Fraser-Moodie [1], B Norton, C Gornall, S Magnago, A R Weale, G K Holmes

Affiliations + expand

PMID: 10365891 DOI: 10.1080/003655299750026326

Abstract

Background: Weight loss is commonly recommended as part of first-line management of gastrooesophageal reflux disease (GORD) despite the paucity of published clinical trials. The aim of this study was to prospectively assess the independent effect of weight loss on reflux symptoms in overweight individuals with either normal endoscopic findings or grade-I oesophagitis.

Methods: Thirty-four patients were recruited on the basis of a body mass index (BMI) of greater than 23 and symptoms of GORD for at least 6 months. All patients were advised to lose weight. Symptoms of gastro-oesophageal reflux (GOR) were scored, using a modified DeMeester questionnaire at 0, 6, and 26 weeks. Patients who were unable to stop taking all medication for control of symptoms were excluded from the study. Changes in weight and symptom score were analysed by using a paired t test. Correlation between change in weight and symptom score was assessed with the Pearson correlation test.

Results: Thirty-four patients were studied (18 men and 16 women) with a mean age of 65 years (range, 24-70 years). The mean weight at recruitment was 83.4 kg (standard deviation (s), 4.5 kg; BMI, 23.5 kg/m2 (s, 2.3 kg/m2). Twenty-seven patients (80% of the total) lost weight with a mean of 4.0 kg ($P < 0.01$) and improved by a mean reduction of 75% from the initial symptom score ($P < 0.001$). In nine patients the symptoms disappeared completely. Three patients gained weight and had a deterioration of their symptoms, whereas four patients gained weight but still improved their symptom score. There was a significant direct correlation between weight loss and symptom score ($R = 0.548$, $P < 0.001$).

Conclusions: This study has shown a significant association between weight loss and improvement in symptoms of GOR. Patients who are overweight should be encouraged to lose weight as part of the first-line management.

RYGB[8,9]

Symptomatic improvement in gastroesophageal reflux disease (GERD) following laparoscopic Roux-en-Y gastric bypass

E E Frezza [1], S Ikramuddin, W Gourash, T Rakitt, A Kingston, J Luketich, P Schauer

Affiliations + expand

PMID: 11984683 DOI: 10.1007/s00464-001-8313-5

Abstract

Background: The purpose of this study was to determine the effect of laparoscopic Roux-en-Y gastric bypass (LRYGBP) on symptomatic control of gastroesophageal reflux disease (GERD).

Methods: Morbidly obese patients (n = 435) who underwent LRYGBP for morbid obesity were assessed for changes in GERD symptoms, quality of life, and patient satisfaction after surgery.

Results: A total of 238 patients (55%) had evidence of chronic GERD, and 152 patients (64%) voluntarily participated in the study. The mean body mass index (BMI) was 48 kg/m2. The mean excess weight loss was 68.8% at 12 months. There was a significant decrease in GERD-related symptoms, including heartburn (from 87% to 22%, $p<0.001$); water brash (from 18% to 7%, $p<0.05$); wheezing (from 40% to 5%, $p<0.001$) laryngitis (from 17% to 7%, $p<0.05$); and aspiration (from 14% to 2%, $p<0.01$) following LRYGBP. Postoperatively, the use of medication decreased significantly both for proton pump inhibitors (from 44% to 9%, $p<0.001$) and for the H2 blockers (from 60% to 10%, $p<0.01$). SF-36 physical function scores and the mental component summary scores improved after the operation (87 vs 71; $p<0.05$ and 83 vs 66; $p<0.05$, respectively). Overall patient satisfaction was 97%.

Conclusion: LRYGBP results in very good control of GERD in morbidly obese patients with follow-up as late as 3 years. Morbidly obese patients who require surgery for GERD may be better served by LRYGBP than fundoplication because of the additional benefit of significant weight loss.

Amelioration of gastroesophageal reflux symptoms following Roux-en-Y gastric bypass for clinically significant obesity

Lana G Nelson [1], Rodrigo Gonzalez, Krista Haines, Scott F Gallagher, Michel M Murr

Affiliations + expand

PMID: 16372614

Abstract

Symptoms of gastroesophageal reflux disease (GERD) are frequent in patients with clinically significant obesity and are reported to improve after Roux-en-Y gastric bypass (RYGB). The purpose of this study is to determine timing and duration of improvement of GERD symptoms in patients undergoing RYGB. Prospectively collected data from patients who underwent RYGB from January 1998 to August 2004 were analyzed. Patients answered a standardized questionnaire pre- and postoperatively inquiring about frequency of GERD symptoms (none, one episode/ week, one episode/day, more than one episode/day) and medication use. Of 606 patients undergoing RYGB, 239 patients (39%) reported GERD symptoms preoperatively (mean age 43 +/- 1 years; body mass index 51 +/- 1 kg/m2). Of these, 89 per cent of patients reported improved at 3 months post-op and 94 per cent of patients 9 months post-op ($P < 0.001$). Medication usage decreased from 30 per cent to 3 per cent by 3 months and 5 per cent beyond 9 months ($P < 0.001$). Percentage of excess weight loss was 18 +/- 1 per cent and 75 +/- 2 per cent at 3 and 9 months, respectively. Symptoms of GERD significantly improve and use of antireflux medications is reduced after RYGB independent of weight loss. RYGB may be the treatment of choice for GERD in obese patients.

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FURTHER RESEARCH

- **Improvement in Sx of GORD after different types of bariatric surgery**
  - Roux-en-Y gastric bypass, sleeve gastrectomy, gastric band, duodenal switch
- Improvement in Sx of GORD after weight loss v.s. bariatric surgery
- GORD in patients with higher BMIs
  - Sub-group patients with BMI≥30 (e.g. 30≤ BMI<35, 35≤ BMI<40, etc.)
- Improvement in QoL of patients with obesity post-LARS

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IMAGE REFERENCES

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THANK YOU FOR LISTENING

APPENDIX

First author	Publication study year	Design of the study	Total number of cases n =	Follow-up in months	BMI categories	Regrouping of BMI for meta-analyses	BMI n =	Reported outcomes	Study quality score
Winslow	2003	Prospective cohort	504	35	<25, 25–29.9, ≥30	<30 ≥30	292 212	PC, RE-HS, RE-ED, ERT	7
D'Alessio	2005	Prospective cohort	257	26	<25, 25–29.9, ≥30	<30 ≥30	195 62	PC, ERT, OD	8
Anvari	2005	Retrospective cohort	140	41.6	<30, ≥35	<30 ≥30	70 70	RR, PC, RE-HS, ERT	7
Ng	2007	Prospective cohort	366	12	<30, ≥30	<30 ≥30	292 74	PC,RE-HS, RE-ED, CON, ERT,	7
Tsuboi	2009	Retrospective cohort	145	77	<25, 25–29.9, ≥30	<30 ≥30	135 10	RR	9
Tekin	2011	Prospective cohort	1000	53	<25, 25–29.9, ≥30	<30 ≥30-35 ≥35	868 132 70	RR, PC, RE-HS, RE-ED, CON	7
Telem	2014	Retrospective cohort	4231	1	<35, ≥35	<35 ≥35	3496 735	PC, ERT	7
Schietroma	2017	Retrospective cohort	201	198	<25, 25–29.9, ≥30	<30 ≥30	132 69	RR, RE-HS, RE-ED, CON	8
Andolfi	2017	Retrospective cohort	176	17	<30, 30–34.9, ≥35	<30 ≥30	111 65	RR	7

Newcastle-Ottawa Scale[10]

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