

De novo Gastroesophageal Reflux after Sleeve Gastrectomy: correlation with bougie size and stapling distance from the pylorus Systematic Review and Meta-analysis

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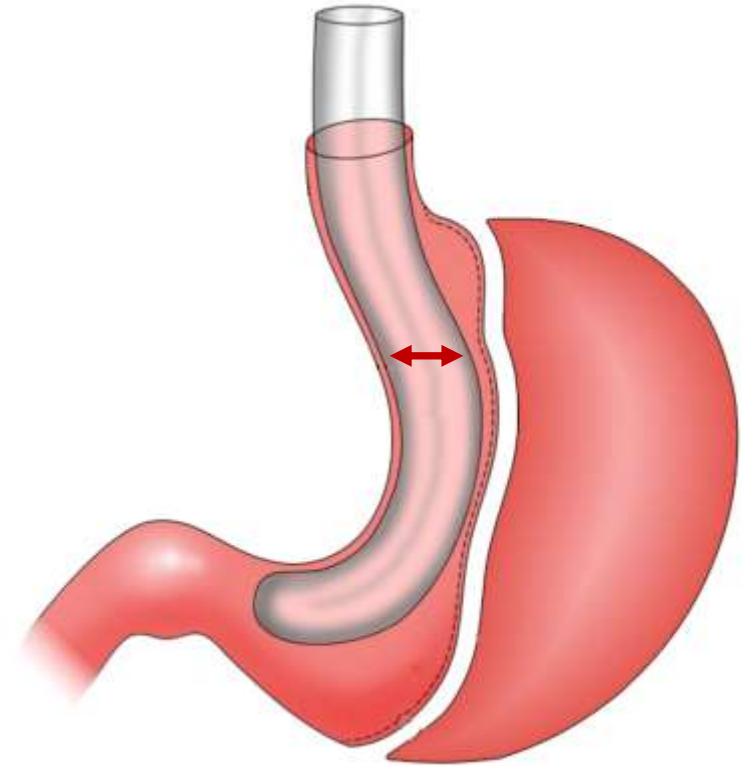
None disclosure

Introduction

- Persistent concern after LSG regarding:
 - De novo GERD: Rate
 - Worsening GERD: previous symptoms
- Increase in number of revisional surgery
- GERD after LSG

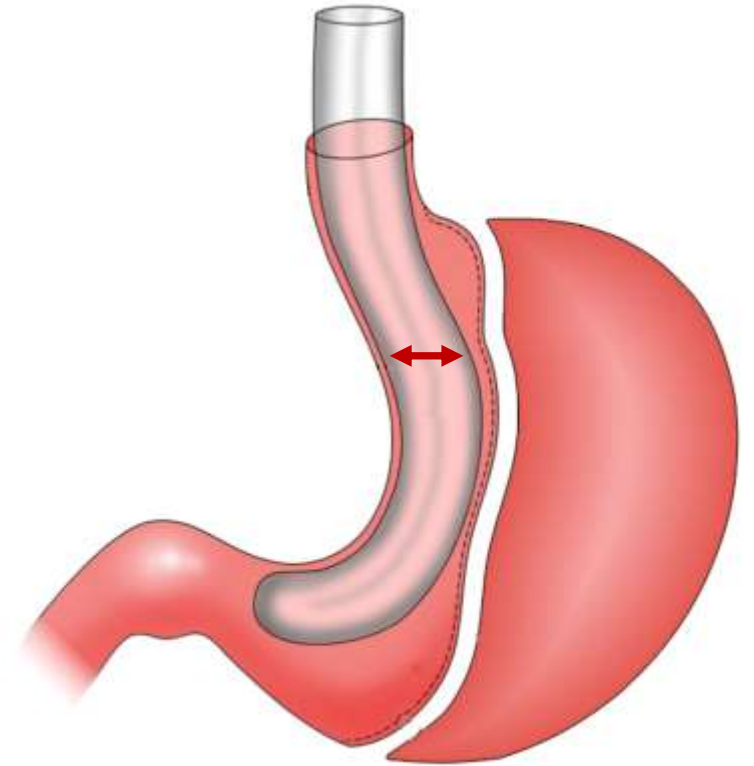
Introduction

- **Surgical technical factors**
- **Surgeon options:**
 - Bougie size
 - Stapling distance from the pylorus
- **It is still unclear**
 - These technical factors
 - Affect the long-term prevalence
 - De novo GERD



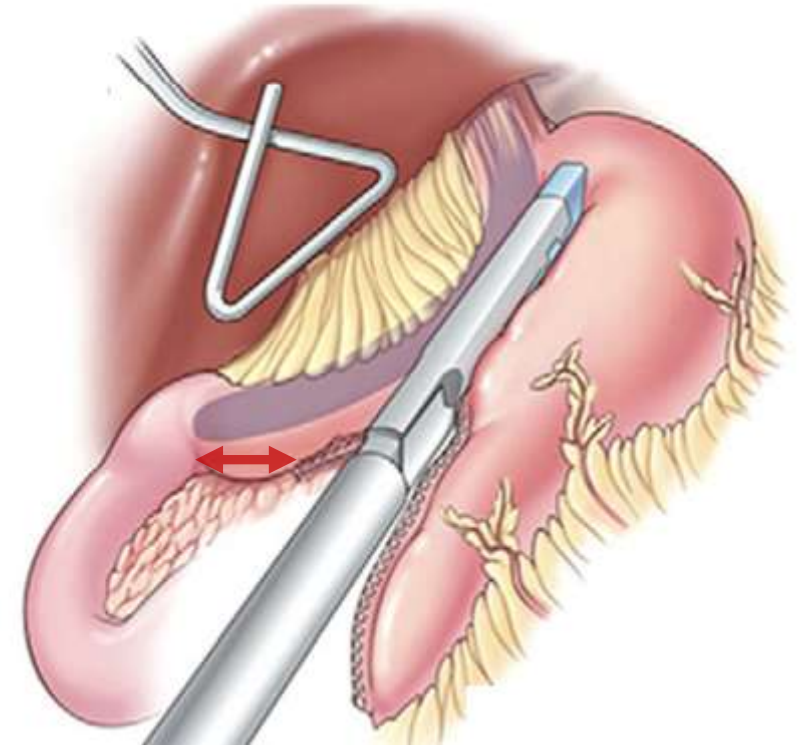
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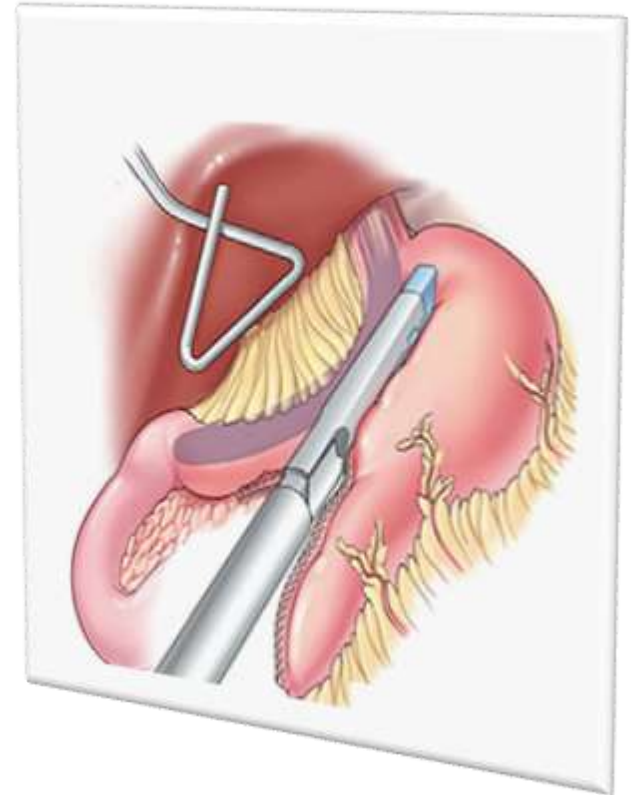
Introduction

- **Surgical factors**
- **Surgeon options:**
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 - Stapling distance from the pylorus
- **It is still unclear**
 - These technical factors
 - De novo GERD
 - The long-term prevalence



Aim of Study

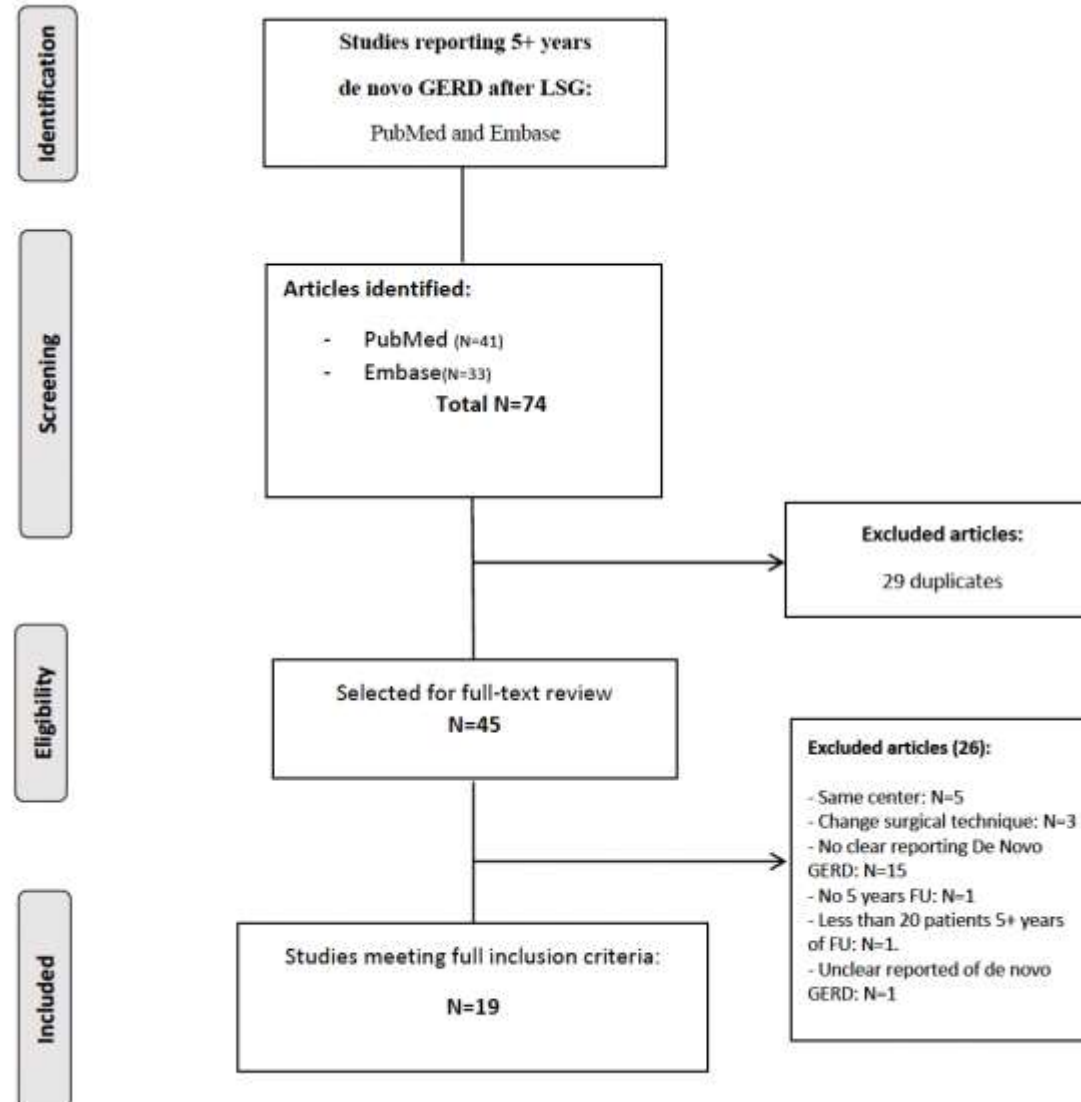
- To assess the possible correlation between Bougie size / Stapling distance from the pylorus and the prevalence of de novo GERD five or more years after LSG



Methods

- **Systematic review and meta-analysis**
 - De novo GERD
 - Papers reporting outcome 5 years or more after LSG
- **Retrospective and prospective studies**
- **Symptom reporting / upper gastrointestinal endoscopy /Ph monitoring**

Flow diagram of articles included in the systematic review



Results

STUDY	Age (Y) (Range)	Male (%)	Preop BMI (Kg/m ²) (Range)	Preop GERD (%)	FU rate (%)	Patients (N)	FU (months)
Alexandrou 2015 [30]	(A) 41.3 ± 2.4	28	(A) 55.5 ± 1.7	0	20	25	70
Angrisani 2016 [31] (O)* (SO)*	(A) 40 ± 10 (A) 38 ± 11	28 48	(A) 41 ± 5 (A) 57 ± 6	31 25	84 79	40 26	60 60
Arman 2016 [32]	(A) 38.1 ± 10	23.4	(A) 38.6 ± 6.2	12.8	59	42	140
Boza 2014 [7]	(M) 36 (16 – 65)	29.2	(M) 34.9 (IQR 33.3 – 37.5)	4.3	70	105	60
Braghetto 2016 [10]	-	27.3	(A) 38.4 ± 3.1	0	28	66	60
Castagneto 2018 [33]	(A) 43.4 ± 11.0	34.2	(A) 46.6 ± 7.3	18.9	77	92	122
Chuffart 2017 [34]	(A) 46 ± 12	43.9	(A) 47 ± 8	26.8	67	28	72
Dakour 2016 [35]	(A) 36.5 ± 13.3	37.9	(A) 42.8 ± 7.1	25.8	90	49	60
Felsenreich 2018 [36]	(A) 38.8 ± 12.5	25	(A) 48.7 ± 9.1	0	100	76	132
Gadiot 2017 [37]	(A) 42 ± 10.7	23.8	(A) 44.8 ± 6.7	18.3	55	125	60
Kehagias 2013 [38]	(A) 34.3 ± 10.3	-	(A) 43.2 ± 2.8	0	77.7	21	60
Kowalewski 2018 [39]	(M) 39 (17 – 64)	53	(M) 51.6 (35.9 – 72.0)	4	80	96	96
Kular 2014 [40]	-	-	(A) 42 ± 5.2	5.5	64	75	60
Mandeville 2017 [41]	(A) 41.4 (15 – 69)	39	(A) 40.6 (30.3 – 67.5)	17	88	67	102
Nasta 2019 [42]	(A) 39.2 ± 11.8	39	(A) 45.4 ± 9.4	9.2	70.2	133	60
Peterli 2018 [43]	(A) 43.0 ± 1.1	28	(A) 43.6 ± 5.2	43.6	95	57	60
Pok 2016 [44]	(A) 34.5 ± 9.7	25.3	(A) 37.3 ± 8.1	-	51	29	60
Rawlins 2013 [45]	(A) 44 (20 – 65)	30	(A) 65 (39 – 106)	30.6	100	38	60
Seyit 2020 [46]	(A) 37.8 ± 9.9	25.8	(A) 48.3 ± 6.8	3.3	83	120	67
Weighted Average (Range)	N/A	30.2% (23-53)	N/A	12.3% (0-43.6)	75% (28-100)	1311 (21-126)	77 months (60-140)

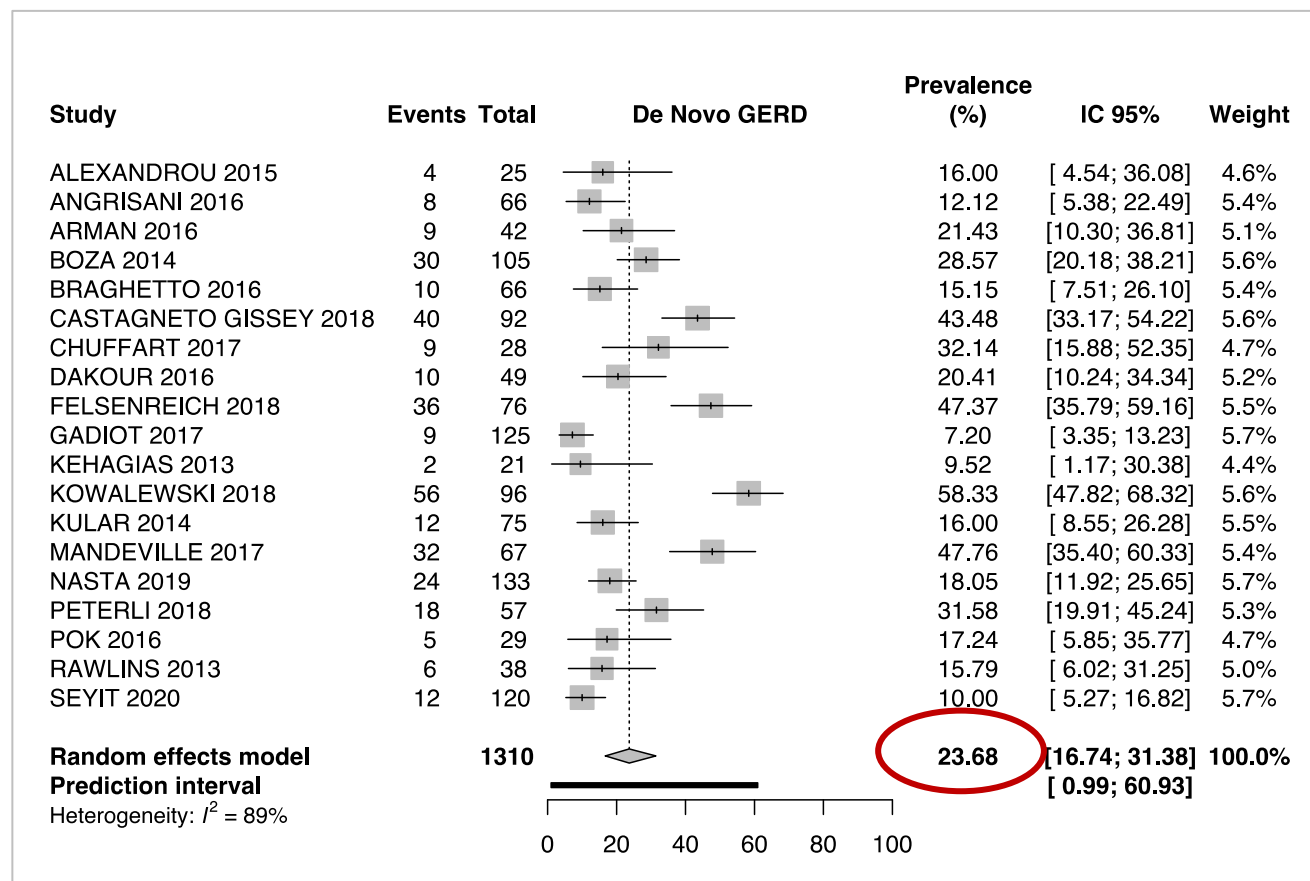
(O) = Obesity; (SO) = Superobesity; * Same study; (Y) = Years-old; (A) = Average; (M) = Median; IQR = Interquartile Range; FU = Follow-up; N/A = not applicable.

Results

STUDY	De novo GERD Diagnosis criteria	Bougie size (Fr)	Distance (cm) from the pylorus \bar{x} (range)	Delta BMI	De novo GERD % (Ev/n)	Newcastle Score
Alexandrou 2015 [30]	Symptoms	29	3.5 (3-4)	19.2	16 (4/25)	4
Angrisani 2016 [31]	(O)*	40	4 (3-5)	11.2	15 (6/40)	7
	(SO)*	40	4 (3-5)	19.1	8 (2/26)	7
Arman 2016[32]	Symptoms	34	5.5 (5-6)	8.9	21.4 (9/42)	6
Boza 2014 [7]	Symptoms	60	6	6.4	28.6 (30/105)	6
Braghetto 2016 [10]	Endoscopy**	32	2.5 (2-3)	8.5	15.5 (10/66)	6
Castagneto 2018 [33]	Endoscopy**	48	4.5 (4-6)	15.1	42.9 (40/92)	7
Chuffart 2017 [34]	Symptoms	36	8	10.5	32.1 (9/28)	7
Dakour 2016 [35]	Symptoms	36	4	11.2	21.2 (10/49)	6
Felsenreich 2018 [36]	Endoscopy plus***	45	6	13.3	47.4 (36/76)	7
Gadiot 2017 [37]	Symptoms	34	2.5 (2-3)	11.6	7.2 (9/125)	6
Kehagias 2013 [38]	Symptoms	32	3	11.2	9.5 (2/21)	6
Kowalewski 2018 [39]	Symptoms	36	5.5 (5-6)	12.1	58.3 (56/96)	6
Kular 2014 [40]	Symptoms	37	5	7	16 (12/75)	6
Mandeville 2017 [41]	Symptoms	34	6	-	47.8 (32/67)	7
Nasta 2019 [42]	Endoscopy*	36	5	-	18 (24/133)	7
Peterli 2018 [43]	Symptoms	35	4.5 (3-6)	-	31.6 (18/57)	7
Pok 2016 [44]	Symptoms	36	4	10.5	17 (5/29)	6
Rawlins 2013[45]	Endoscopy*	26	3	28.3	16 (6/38)	7
Seyit 2020[46]	Symptoms	36	2	16.1	10 (12/120)	7
Weighted Average (Min And Max)	N/A	38.5 Fr (26-60)	4.4 cm (2-8)	9.9 (6.4-28.3)	25.3% (7.2-58.3)	6.3 (4-7)

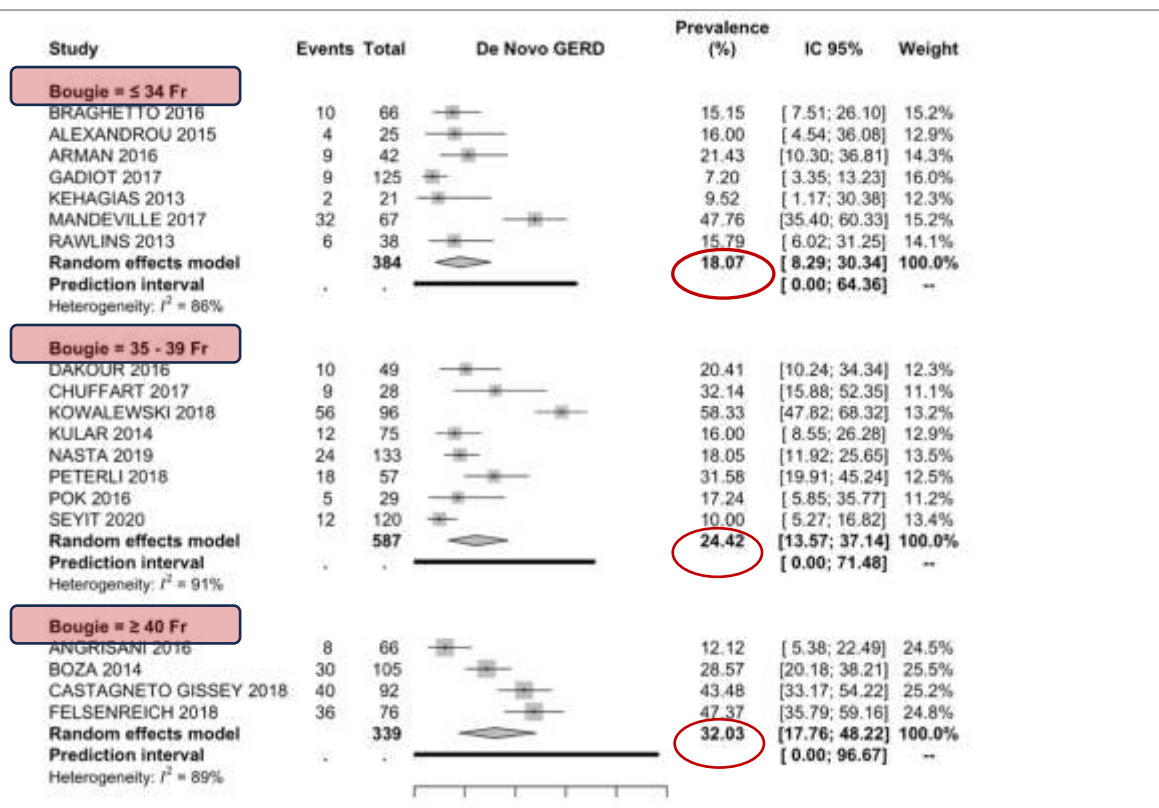
(O) = Obesity; (SO) = Superobesity; * Same study; Newcastle-Ottawa Scale Score (Quality): Poor (< 3), Fair (4-6) or Good (>7); Ev/n = Events/ number of cases; \bar{x} = Average; Endoscopy**: Selectively depending on patient's symptoms; Endoscopy plus***= pH monitoring and others; N/A = not applicable.

De novo GERD overall prevalence



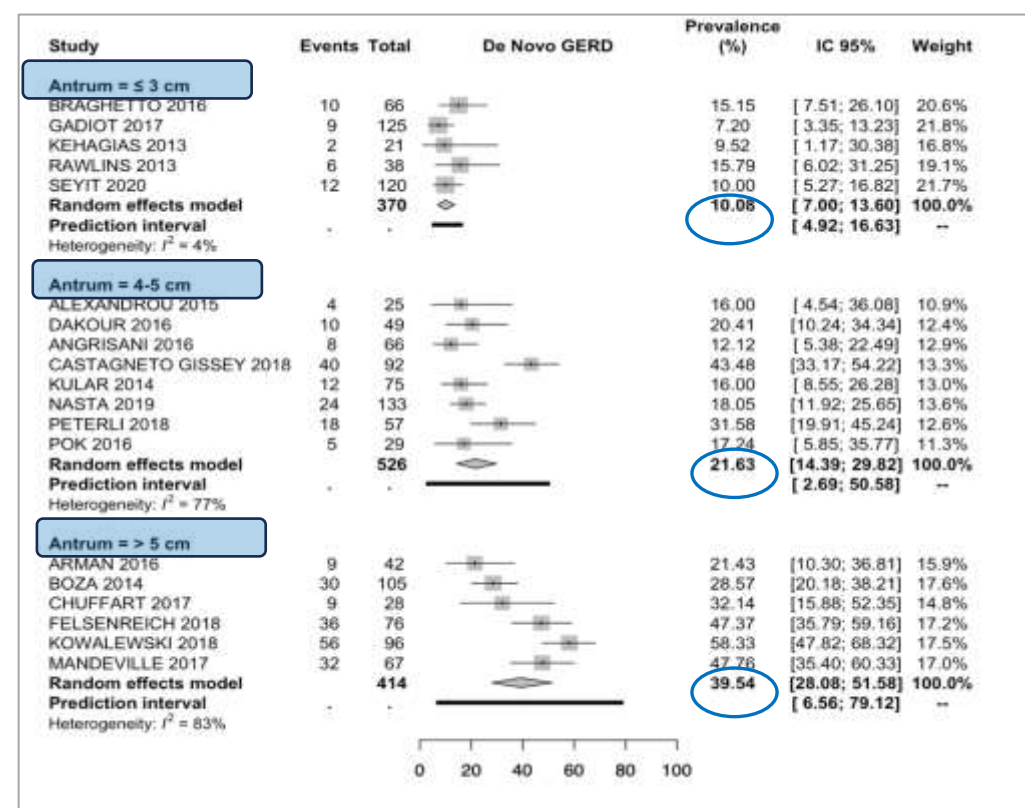
De novo GERD

Bougie Sizes and Stapling distance



Bougie sizes (Fr)

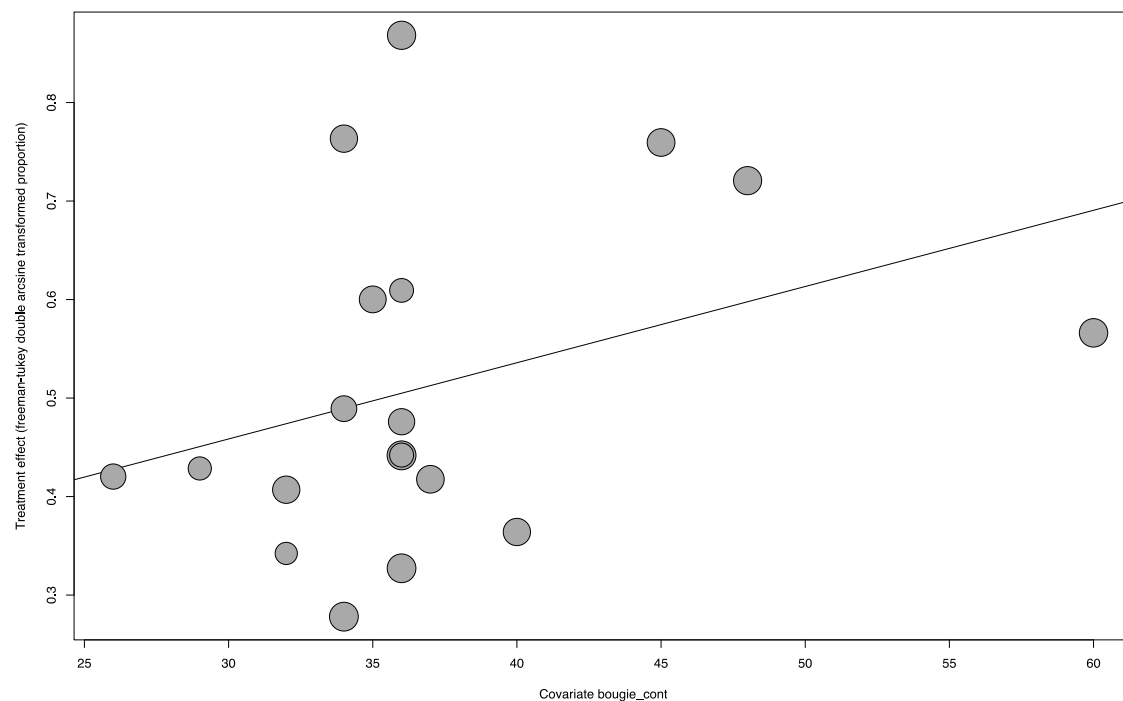
$p = 0.368$



Stapling distance from pylorus (cm)

$p < 0.0001$

Meta-regression for de novo GERD

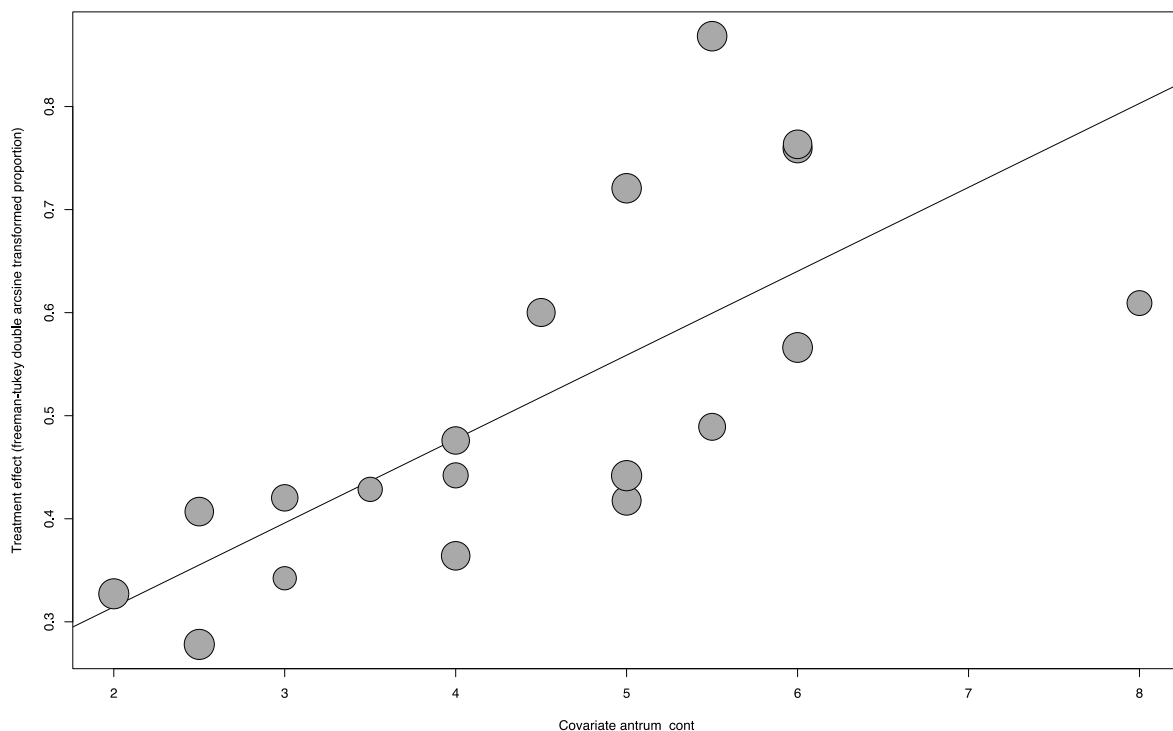


Bougie Sizes

	Estimate	SE	Z value	p value	ci.lb	ci.ub
Intercept	0.2263	0.2182	1.0369	0.2998	-0.2015	0.6540
Bougie	0.0077	0.0058	1.3446	0.1788	-0.0035	0.0190

ci.lb (lower bound of the confidence interval), ci.ub (upper bound of the confidence interval).

Meta-regression for de novo GERD



Stapling distance from pylorus

	Estimate	SE	Z value	p value	ci.lb	ci.ub
Intercept	0.1516	0.0969	1.5642	0.1178	0.0384	0.3415
Antrum	0.0814	0.0206	3.9574	<.0001	0.0411	0.1217

ci.lb (lower bound of the confidence interval), ci.ub (upper bound of the confidence interval).

1 cm – 8% in de Novo GERD rate

CONCLUSIONS

- Overall prevalence of de novo GERD five or more years after LSG of 23.7%.
- No correlation between **bougie size** and **de novo GERD**
- Important correlation between **First stapler distance from the pylorus** and **de novo GERD**
 - Each 1 cm of antrum
 - Increase 8.1% in the prevalence of de novo GERD
- Prospective studies are needed to assess the exact impact of surgical technique factors on LSG outcomes

THANK YOU FOR
YOUR ATTENTION

