DE LEESTAFEL
MAART 2019

Een Maandelijkse Selectie van Wetenschappelijke GE-nieuws

Coloproctologie

Verminderde vroege mortaliteit colonkanker chirurgie door pre-operatief gebruik van betablokkers?

Effect of beta‐blocker therapy on early mortality after emergency colonic cancer surgery. R Ahl et al. BJS, March 2019 – Volume 106 – Issue 3, pages 477-483. Pubmed ID: 30259967

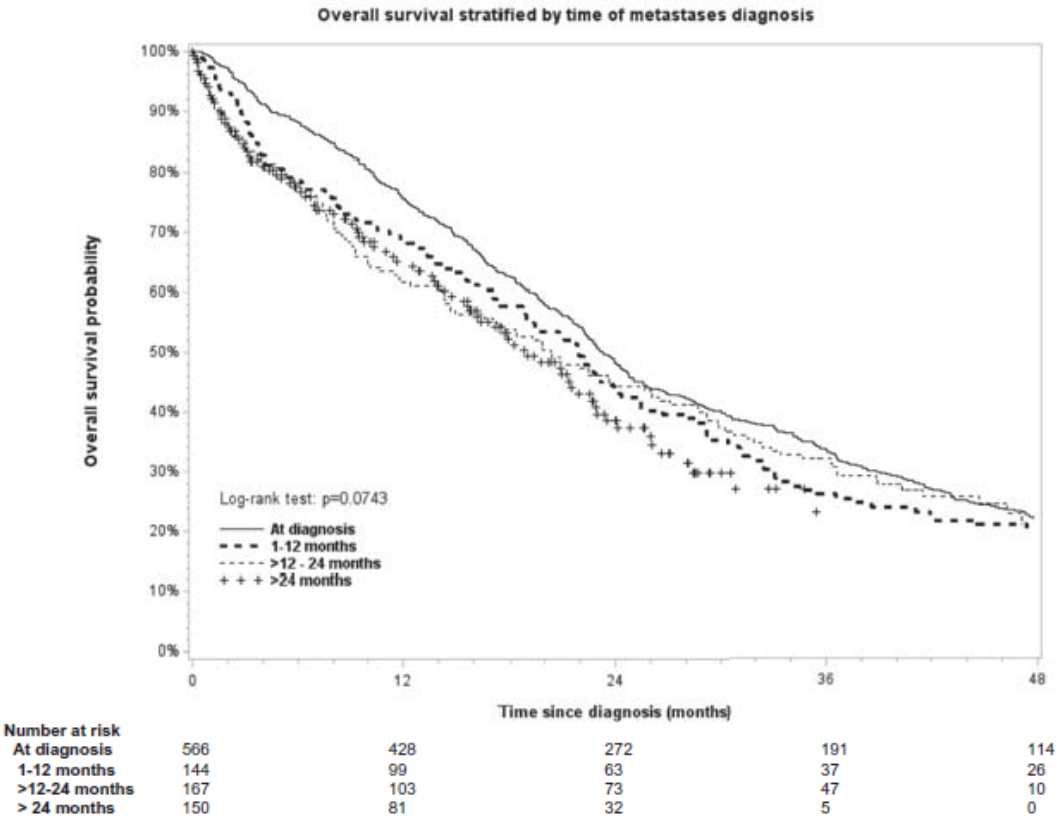
BACKGROUND: Emergency colorectal cancer surgery is associated with significant mortality. Induced adrenergic hyperactivity is thought to be an important contributor. Downregulating the effects of circulating catecholamines may reduce the risk of adverse outcomes. This study assessed whether regular preoperative beta-blockade reduced mortality after emergency colonic cancer surgery.
METHODS: This cohort study used the prospectively collected Swedish Colorectal Cancer Registry to recruit all adult patients requiring emergency colonic cancer surgery between 2011 and 2016. Patients were subdivided into those receiving regular beta-blocker therapy before surgery and those who were not (control). Demographics and clinical outcomes were compared. Risk factors for 30-day mortality were evaluated using Poisson regression analysis.
RESULTS: A total of 3187 patients were included, of whom 685 (21·5 per cent) used regular beta-blocker therapy before surgery. The overall 30-day mortality rate was significantly reduced in the beta-blocker group compared with controls: 3·1 (95 per cent c.i. 1·9 to 4·7) versus 8·6 (7·6 to 9·8) per cent respectively (P < 0·001). Beta-blocker therapy was the only modifiable protective factor identified in multivariable analysis of 30-day all-cause mortality (incidence rate ratio 0·31, 95 per cent c.i. 0·20 to 0·47; P < 0·001) and was associated with a significant reduction in death of cardiovascular, respiratory, sepsis and multiple organ failure origin.
CONCLUSION: Preoperative beta-blocker therapy may be associated with a reduction in 30-day mortality following emergency colonic cancer surgery.

Geen slechtere prognose bij vroege metastasering colorectaal carcinoom, in vergelijking met late metastasering.

Time of metastasis and outcome in colorectal cancer. NN Rahbari et al. Annals of Surgery: 2019;269(3);494–502. Pubmed ID: 29064893

OBJECTIVE: The aim of this study was to evaluate outcomes of metastases at various time intervals after colorectal cancer (CRC) diagnosis.
BACKGROUND: Earlier studies have indicated a short time interval between CRC diagnosis and distant metastases to be associated with poor prognosis. The majority of studies assessed outcome from CRC diagnosis or metastasis resection rather than from metastasis diagnosis and might be subject to immortal time bias.
METHODS: Patients in the population-based DACHS study were stratified: metastases at/within 1 month (immediate), 2 to 6 months (early), 7 to 12 months (intermediate), and >12 months (late)

after CRC diagnosis. The primary endpoint was overall survival (OS) from metastasis diagnosis. Cox proportional hazards regression models were used to calculate hazard ratios (HRs) and 95% confidence intervals (CI). HRs were adjusted for important confounders and immortal time.
RESULTS: A total of 1027 patients were included. T4 ($P < 0.0001$) and node-positive tumors ($P < 0.0001$) were more frequent in the immediate group. Lung metastases ($P < 0.0001$) and single-site metastases ($P < 0.0001$) were more prevalent in the late group. In multivariable analysis, immediate metastases were not associated with poor OS compared to metastases at later time points (late vs immediate: HR 1.21; 95% CI, 0.98-1.48). Subgroup analyses revealed poor OS of late versus immediate metastases for females (1.45; 1.08-1.96), proximal colon cancer (1.54; 1.09-2.16), and N0 (1.46; 1.00-2.12) or N1 disease (1.88; 1.17-3.05).
CONCLUSIONS: Immediate or early metastases are not associated with unfavorable outcome compared to late metastases. These findings challenge the current notion of poor outcome for CRC with immediate or early metastases.



Number at risk					
At diagnosis	566	428	272	191	114
1-12 months	144	99	63	37	26
>12-24 months	167	103	73	47	10
> 24 months	150	81	32	5	0

UPPER GI

Betrouwbaarheid negatieve vriescoupe tijdens maagresectie

Prevalence of False-Negative Results of Intraoperative Consultation on Surgical Margins During Resection of Gastric and Gastroesophageal Adenocarcinoma. JC McAuliffe et al. JAMA Surg. 2019;154(2):126-132. Pubmed ID: 30422226

IMPORTANCE Intraoperative consultation (IOC) on surgical margins during curative intent resection of gastric and gastroesophageal adenocarcinoma presents sampling and interpretive challenges. A false-negative (FN) IOC result can affect clinical care. Many factors may be associated with higher risk for an FN result of IOC on surgical margins.

OBJECTIVE To assess the prevalence and clinical implications of FN results of IOC on surgical margins during resection of gastric and gastroesophageal adenocarcinoma.

DESIGN, SETTING, AND PARTICIPANTS This retrospective study assessed the results of IOC on surgical margins to determine the prevalence of FN results and the accuracy and clinical implications of the results for patients undergoing curative intent resection for gastric or gastroesophageal adenocarcinoma. The study examined patients with gastric or gastroesophageal adenocarcinoma who underwent resection with curative intent at a single-institution referral center from January 1, 1992, to December 31, 2015.

INTERVENTIONS Curative intent gastric and/or esophageal resection.

MAIN OUTCOMES AND MEASURES False-negative results of IOC on surgical margins, accuracy of the results, factors associated with decreased accuracy of the results, and clinical implications of FN results.

RESULTS This study included 2002 patients (median age, 65 years; 1343 [67.1%] male; 1638 [81.8%] white) who received 3171 IOCs on surgical margins. Of the 3171 IOCs, the prevalence of FN results was 1.7%, with an accuracy of 98.1%. The prevalence of an FN IOC result was 1.2% for esophageal margins, 2.0% for gastric margins, and 2.5% for duodenal margins (P = .04). The prevalence of an FN IOC result was higher for patients with diffuse or signet ring disease compared with those without (2.6% vs 1.2%, P = .002) and for those not receiving neoadjuvant radiotherapy compared with those receiving neoadjuvant radiotherapy (1.4% vs 0.7%, P < .001). The prevalence of FN results of IOCs performed by nongastrointestinal pathologists was similar to that of IOCs performed by gastrointestinal pathologists (2.3% vs 1.9%, P = .60). The disease-specific survival was 34 months (95% CI, 20.7-47.2 months) for those with an FN result and 26.9 months (95% CI, 18.3-35.4; P = .72) for those with a true-positive result. Half of the patients with FN IOC results received further margin-directed therapy, including subsequent resection or radiotherapy.

CONCLUSIONS AND RELEVANCE This study found that IOC on surgical margins was accurate at a specialty center. Signet ring or diffuse disease, duodenal margins, and not receiving neoadjuvant radiotherapy were challenging scenarios for IOC on surgical margins. The use of IOC on surgical

Table 3. Prevalence of False-Negative Results and Accuracy

Variable	Prevalence of False-Negative Results, %	Accuracy, %	*P* Value
Overall	1.7	98.1	NA
Margin			
Esophageal	1.2	98.7	.05
Gastric	2.0	97.8	
Duodenal	2.5	96.8	
Disease type			
Signet ring	3.0	96.7	<.001
Non-signet ring	1.2	98.6	
Diffuse	2.7	96.9	.007
Nondiffuse	1.4	98.4	
Signet ring and diffuse	2.6	97.1	.002
Non-signet ring and diffuse	1.2	98.7	
Treatment			
Neoadjuvant chemotherapy	2.9	97.1	.06
No neoadjuvant chemotherapy	1.4	98.3	
Neoadjuvant radiotherapy	0.7	99.3	<.001
No neoadjuvant radiotherapy	1.4	98.4	
Risk factors[a]			
Risk features	4.7	95.3	<.001
No risk features	0.8	99.0	
Pathologist			
Gastrointestinal	1.9	98.1	.60
Nongastrointestinal	2.3	97.6	

Abbreviation: NA, not applicable.

[a] Risk factors include diffuse and signet ring disease, neoadjuvant chemotherapy, and no neoadjuvant radiotherapy.

margins may be optimal when it will affect intraoperative decision making framed by the stage of disease, tumor location, and surgical fitness of the patient.

Whole genome methylation als voorspeller voor het maligne worden van een Barrett oesophagus

Whole genome methylation analysis of nondysplastic Barrett esophagus that progresses to invasive cancer. PM Dilworth et al. Annals of Surgery: 2019;269(3);479–485. Pubmed ID: 29384778

OBJECTIVE: To investigate differences in methylation between patients with nondysplastic Barrett esophagus who progress to invasive adenocarcinoma and those who do not.
BACKGROUND: Identifying patients with nondysplastic Barrett esophagus who progress to invasive adenocarcinoma remains a challenge. Previous studies have demonstrated the potential utility of epigenetic markers for identifying this group.
METHODS: A whole genome methylation interrogation using the Illumina HumanMethylation 450 array of patients with nondysplastic Barrett esophagus who either develop adenocarcinoma or remain static, with validation of findings by bisulfite pyrosequencing.
RESULTS: In all, 12 patients with "progressive" versus 12 with "nonprogressive" nondysplastic Barrett esophagus were analyzed via methylation array. Forty-four methylation markers were identified that may be able to discriminate between nondysplastic Barrett esophagus that either progress to adenocarcinoma or remain static. Hypomethylation of the recently identified tumor suppressor OR3A4 (probe cg09890332) validated in a separate cohort of samples (median methylation in progressors 67.8% vs 96.7% in nonprogressors; P = 0.0001, z = 3.85, Wilcoxon rank-sum test) and was associated with the progression to adenocarcinoma. There were no differences in copy number between the 2 groups, but a global trend towards hypomethylation in the progressor group was observed.
CONCLUSION: Hypomethylation of OR3A4 has the ability to risk stratify the patient with nondysplastic Barrett esophagus and may form the basis of a future surveillance program.

HPB

Weinig externe validatie van predictie modellen bij pancreascarcinoom

Systematic review of clinical prediction models for survival after surgery for resectable pancreatic cancer. M Strijker et al; BJS, March 2019 – Volume 106 – Issue 3, pages 342-354. Pubmed ID: 30758855

BACKGROUND: As more therapeutic options for pancreatic cancer are becoming available, there is a need to improve outcome prediction to support shared decision-making. A systematic evaluation of prediction models in resectable pancreatic cancer is lacking.
METHOD: This systematic review followed the CHARMS and PRISMA guidelines. PubMed, Embase and Cochrane Library databases were searched up to 11 October 2017. Studies reporting development or validation of models predicting survival in resectable pancreatic cancer were included. Models without performance measures, reviews, abstracts or more than 10 per cent of patients not undergoing resection in postoperative models were excluded. Studies were appraised critically.
RESULTS: After screening 4403 studies, 22 (44 319 patients) were included. There were 19 model development/update studies and three validation studies, altogether concerning 21 individual models. Two studies were deemed at low risk of bias. Eight models were developed for the

preoperative setting and 13 for the postoperative setting. Most frequently included parameters were differentiation grade (11 of 21 models), nodal status (8 of 21) and serum albumin (7 of 21). Treatment-related variables were included in three models. The C-statistic/area under the curve values ranged from 0·57 to 0·90. Based on study design, validation methods and the availability of web-based calculators, two models were identified as the most promising.
CONCLUSION: Although a large number of prediction models for resectable pancreatic cancer have been reported, most are at high risk of bias and have not been validated externally. This overview of prognostic factors provided practical recommendations that could help in designing easily applicable prediction models to support shared decision-making.

Table 4 Recommendations for future model development and validation studies

Recommendation	Examples	Useful literature
Clinical relevance		
Aim to help clinical decision-making relevant for patient by: Accounting for treatment strategies, e.g. by including treatment as a variable in the model Develop a decision rule with predicted outcome determining subsequent patient management Include not only prognostic, but also predictive parameters in the model (if available)*	Adjuvant![6] PREDICT and PREDICT+[5]	Groenwold *et al.*[61] van Klaveren *et al.*[62]
More focus on pretreatment models, as more neoadjuvant strategies more likely to be included in the future	Chagpar *et al.*[24] la Torre *et al.*[27]	
Present models as easily applicable to use (online) tool: Available for all clinicians Can be used during clinical consultations	Evidencio: open library for (online) medical prediction models available through https://www.evidencio.com and as an App for mobile phone Pancreas calculator: http://www.pancreascalculator.com	Nomogram construction[63]
Perform a clinical impact study to assess whether a prediction model improves physicians' decisions		Reilly and Evans[45] Steyerberg *et al.*[12]
Methodological		
Perform external validation studies to assess the performance of the model in other cohorts Geographically different cohort rather than temporally different cohort	Soft-tissue sarcomas model validated in three cohorts in same article[64]	Steyerberg *et al.*[12,17] Altman *et al.*[15]
Use adequate methods to develop models Multicentre multinational, prospective cohorts Appropriate statistical analyses		Steyerberg *et al.*[12] Royston *et al.*[16]
Report method of development/validation adequately and transparently so that models can be compared and assessed for quality		TRIPOD statement[14]

*Prognostic (associated with outcome regardless of treatment) *versus* predictive (predicting likelihood of patients responding to a specific therapy).

Ceftriaxon reduceert aantal wondinfecties na Whipple-operatie bij patienten met preoperatieve biliare drainage

Third-generation cephalosporin for antimicrobial prophylaxis in pancreatoduodenectomy in patients with internal preoperative biliary drainage. S Sano et al; Surgery: March 2019 – Volume 165 – Issue 3 – p 559-564. Pubmed ID: 30803620

BACKGROUND AND OBJECTIVE: The aim of the present study was to investigate whether the incidence of surgical site infection after pancreatoduodenectomy decreased after changing the prophylactic antibiotic to a third-generation cephalosporin in patients with unknown preoperative bile culture results after biliary drainage.
METHODS: In a retrospective study of 138 pancreatoduodenectomy patients who underwent endoscopic biliary stenting and for whom recent preoperative bile culture results were unavailable, cefazolin sodium hydrate was administered as perioperative prophylactic antibiotic therapy from 2010 to 2014 (n = 69); whereas ceftriaxone was administered from 2014 to 2017 (n = 69) based on the results of institutional culture surveillance. The incidence of surgical site infection was compared between the two groups and the risk factor of surgical site infection was also evaluated.

RESULTS: The incidence of overall surgical site infection in the ceftriaxone group was significantly lower than that in the cefazolin sodium hydrate group for both Clavien-Dindo grade ≥II (28% versus 52%, P = .005) and Clavien-Dindo grade ≥IIIa (20% vs 41%, P = .016). A multivariate analysis revealed that the prophylactic administration of cefazolin sodium hydrate was associated with a higher incidence of overall surgical site infection in both Clavien-Dindo grade ≥II and Clavien-Dindo grade ≥IIIa (odds ratio 2.56, P = .019; odds ratio 3.03, P = .020, respectively). In the cefazolin sodium hydrate group, most of the patients with positive perioperative cultures had Enterobacteriaceae, which were intrinsically resistant to cefazolin sodium hydrate, and most were susceptible to ceftriaxone.
CONCLUSION: The prophylactic administration of third-generation cephalosporin reduced the incidence of surgical site infection after pancreatoduodenectomy in patients who underwent preoperative endoscopic biliary stenting.

LEVERCHIRURGIE

Steeds meer studies naar pijnstilling middels lokale (wond)infiltratie bij leverresecties

A randomized controlled trial comparing epidural analgesia versus continuous local anesthetic infiltration via abdominal wound catheter in open liver resection. R Bell et al.; Annals of Surgery: 2019;269(3);413–419. Pubmed ID: 30080727

AIM: To compare outcomes following open liver resection (OLR) between patients receiving thoracic epidural (EP) versus abdominal wound catheters plus patient-controlled analgesia (AWC-PCA).
METHOD: Patients were randomized 1:1 to either EP or AWC-PCA within an enhanced recovery protocol. Primary outcome was length of stay (LOS), other variables included functional recovery, pain scores, peak flow, vasopressor and fluid requirements, and postoperative complications.

	Day 0	Day 1		Day 2		Day 3	
		am	pm	am	pm	am	pm
EP (n=41) (median, range) (mean, SD)	1 (0-8) 1.6 (2.1)	2 (0-9) 2.7 (2.4)	1 (0-8) 2 (2.1)	2 (0-8) 2.6 (2.5)	2 (0-10) 2.5 (2.7)	2 (0-9) 2.5 (2)	2 (0-8) 2.6 (2.3)
AWC (n=42) (median, range) (mean, SD)	3 (0-6) 2.3 (1.8)	2 (0-8) 3.1 (2.2)	2.5 (0-8) 3.0 (2.4)	3 (1-10) 3.4 (2.4)	2 (0-8) 2.4 (2.0)	3 (0-8) 3.2 (2.2)	3 (0-7) 3.0 (2.1)
P Value	0.023	0.238	0.040	0.046	0.749	0.106	0.313

FIGURE 2. Visual analogue pain scores at all time points.

RESULTS: Between April 2015 and November 2017, 83 patients were randomized to EP (n = 41) or AWC-PCA (n = 42). Baseline demographics were comparable. No difference was noted in LOS (EP 6 d (3–27) vs AWC-PCA 6 d (3–66), P = 0.886). Treatment failure was 20% in the EP group versus 7% in the AWC-PCA (P = 0.09). Preoperative anesthetic time was shorter in the AWC-PCA group, 49 minutes versus 62 minutes (P = 0.003). EP patients required more vasopressor support immediately postoperatively on day 0 (14% vs 54%, P = <0.001) and day 1 (5% vs 23%, P = 0.021). Pain scores were greater on day 0, afternoon of day 1 and morning of day 2 in the AWC-PCA group however were regarded as low at all time points. No other significant differences were noted in IV fluid requirements, nausea/sedation scores, days to open bowels, length of HDU, and postoperative complications.
CONCLUSIONS: AWC-PCA was associated with reduced treatment failure and a reduced vasopressor

requirement than EP up to 2 days postoperatively. While the use of AWC-PCA did not translate into a shorter LOS in this study, it simplified patient management after OLR. EP cannot be routinely recommended following open liver resections.

Dexamethason vermindert time-to-recovery na leverresctie in patienten met hyperbilirubinemie

Dexamethasone for postoperative hyperbilirubinemia in patients after liver resection: An open-label, randomized controlled trial. C Huang et al; Surgery: March 2019 – Volume 165 – Issue 3 – p 534-540. Pubmed ID: 30348460

BACKGROUND AND OBJECTIVE: Although prophylactic glucocorticoids have been used before liver resection to minimize liver dysfunction, it is unknown whether treatment with glucocorticoids will accelerates recovery from hyperbilirubinemia after liver resection.

METHODS: In this open-label, randomized, controlled trial, patients with hyperbilirubinemia (>2.5 × and ≤5 × the upper limit of normal) within 7 days after hepatic resection were assigned randomly to the dexamethasone or control groups. For the dexamethasone group, 10 mg, 10 mg, and 5 mg dexamethasone were administered intravenously on days 0, 1, and 2, respectively, after randomization. For the control group, patients received standard treatment only. The primary outcome was time to recovery from hyperbilirubinemia defined as the period from the day of randomization to the day when serum bilirubin decreased to ≤1.5 times that of the upper limit of normal. Secondary outcomes were the prevalence of postoperative complications, postoperative hospital stay, and hospital expense.

Table 3
The characteristics of patients after randomization.

	Dexamethasone ($n=38$)	Control ($n=38$)	P value
TTRH, median (IQR)	2 (2–3.25)	4 (3–5)	<.001
Increased serum bilirubin after randomization n (%)	4 (11)	12 (32)	.024
Peak value of serum bilirubin after randomization, mean (SD), μmol/L	48.3 (18.9)	55.4 (18.1)	.099
No. of patients with serum bilirubin >5 × ULN (%)	1 (2.6)	2 (5.3)	1.000*
PLF† (%)	15 (40)	19 (50)	0.356
Infectious complications, n	2	1	1.000*
Postoperative stay, mean (SD), d	9.4 (2.4)	8.6 (2.6)	.151
Hospital expense, mean (SD), CNY	$62,836 ($23,263)	$56,968 ($11,917)	.171

TTRH, time to recovery from hyperbilirubinemia; IQR, interquartile range; CNY, Chinese Yuan.
* Fisher's exact test.
† Posthepatectomy liver failure, according to the ISGLS criteria.

RESULTS: Between March 2016 and December 2017, 76 participants were enrolled (38 in each group). Median time to recovery from hyperbilirubinemia was less in the dexamethasone group than in the control group (2 vs 4 days, P < .001). Serum bilirubin levels were less in the dexamethasone group on days 1–3 after randomization (P < .05). The prevalence of infection, posthepatectomy liver failure, postoperative hospital stay, and hospital expense were not different between the groups.

CONCLUSION: Dexamethasone accelerated recovery from hyperbilirubinemia and decreased serum bilirubin levels without causing more side effects in patients after hepatectomy.

BARIATRISCHE CHIRURGIE

Geeft laparoscopische Roux-Y gastric bypass meer kans op gewichtsverlies dan andere operatieve ingrepen?

Heterogeneity of weight loss after gastric bypass, sleeve gastrectomy, and adjustable gastric banding. D Azagury et al. Surgery: March 2019 – Volume 165 – Issue 3 – p 565-570. Pubmed ID: 30316577

BACKGROUND AND OBJECTIVE: Laparoscopic Roux-en-Y gastric bypass, laparoscopic sleeve gastrectomy, and laparoscopic adjustable gastric banding all lead to substantial weight loss in obese patients. Long-term weight loss can be highly variable beyond 1-year postsurgery. This study examines and compares the frequency distribution of weight loss and lack of treatment effect rates after laparoscopic Roux-en-Y gastric bypass, laparoscopic sleeve gastrectomy, and laparoscopic adjustable gastric banding.

METHODS: A total of 1,331 consecutive patients at a single academic institution were reviewed from a prospectively collected database. Preoperative data collected included demographics, body mass index, and percent excess weight loss. Postoperative BMI and %EWL were collected at 12, 24, and 36 months. Percent excess weight loss was analyzed by the percentiles of excess weight lost, and the distribution of percent excess weight loss was evaluated in 10% increments. Lack of a successful treatment effect was defined as <25% excess weight loss.

Table 3
Postoperative treatment effect rates based on %EWL cutoffs

12 months	LRYGB ($n=916$)	LSG ($n=219$)	LAGB ($n=111$)
Lack of a successful treatment effect (%EWL < 25%)	0.9%	6.4%	25.2%
Intermediate treatment effect (25% < %EWL < 50%)	10.7%	32.6%	45.1%
High treatment effect (%EWL ≥ 50%)	88.4%	61.0%	29.7%
24 months	LRYGB ($n=334$)	LSG ($n=120$)	LAGB ($n=72$)
Lack of a successful treatment effect (%EWL < 25%)	0.3%	17.7%	27.8%
Intermediate treatment effect (25% < %EWL < 50%)	10.8%	34.5%	43.1%
High treatment effect (%EWL ≥50%)	88.9%	47.9%	29.2%
36 months	LRYGB ($n=193$)	LSG ($n=75$)	LAGB ($n=43$)
Lack of a successful treatment effect (%EWL < 25%)	1.0%	25.3%	30.2%
Intermediate treatment effect (25% < %EWL< 50%)	12.4%	36.0%	37.2%
High treatment effect (%EWL ≥ 50%)	86.5%	38.7%	32.6%

RESULTS: Of the 1,331 patients, 72.4% (963) underwent laparoscopic Roux-en-Y gastric bypass, 18.3% (243) laparoscopic sleeve gastrectomy, and 9.4%(125) laparoscopic adjustable gastric banding. Mean percent excess weight loss was greatest for laparoscopic Roux-en-Y gastric bypass, followed by laparoscopic sleeve gastrectomy, and then by laparoscopic adjustable gastric banding at every time point: at 2 years mean percent excess weight loss was 77.9± 24.4 for laparoscopic Roux-en-Y gastric bypass, 50.8 ± 25.8 for laparoscopic sleeve gastrectomy, and 40.8± 25.9 for laparoscopic adjustable gastric banding (P < .0001). The rates of a successful treatment effect s for laparoscopic Roux-en-Y gastric bypass, laparoscopic sleeve gastrectomy, and laparoscopic adjustable gastric banding were 0.9%, 5.2%, and 24.3% at 1 year; 0.3%, 11.1%, and 26.0% at 2 years; and 1.0%, 25.3%, and 30.2% at 3 years. At 1 year, the odds ratio of lack of a successful treatment effect of laparoscopic sleeve gastrectomy versus laparoscopic Roux-en-Y gastric bypass was 6.305 (2.125–19.08; P = .0004), the odds ratio for laparoscopic adjustable gastric banding versus laparoscopic Roux-en-Y gastric bypass was 36.552 (15.64–95.71; P < .0001), and the odds ratio for laparoscopic adjustable gastric banding versus laparoscopic sleeve gastrectomy was 5.791 (2.519–14.599; P < .0001). At 2 years, the odds ratio for laparoscopic sleeve gastrectomy versus laparoscopic Roux-en-Y gastric bypass increased to

70.7 (9.4–531.7; P < .0001), the odds ratio for laparoscopic adjustable gastric banding versus laparoscopic Roux-en-Y gastric bypass increased to 128.1 (16.8–974.3; P < .0001), and the odds ratio for laparoscopic adjustable gastric banding versus laparoscopic sleeve gastrectomy decreased to 1.8 (0.9–3.6; P = .09).

CONCLUSION: This study emphasizes the existing variability in weight loss across bariatric procedures as well as in the lack of a treatment effect for each procedure. Although laparoscopic adjustable gastric banding has the greatest rate of a lack of a successful treatment effect, the rate remained stable over 3 years postoperatively. Laparoscopic sleeve gastrectomy showed a doubling in the rate of a lack of a successful treatment effect every year reaching 25% at year 3. The rates for lack of a successful treatment effect for laparoscopic Roux-en-Y gastric bypass remained stable at about 1% for the first 3 years postoperatively.