# Factors associated with anastomotic leak in conversion bariatric surgery: An MBSAQIP Analysis

**Gregory A. Wasserman DO PhD**, Kyle Mobbs MD, Ruben Salas Parra MD, Mitchell S. Roslin MD, Marc Bessler MD, Filippo Filicori MD, Vikrom K. Dhar MD

Department of Surgery, Northwell Health, Lenox Hill Hospital, New York, NY and New Hyde Park, NY

## Background

- Anastomotic leak is one of the most feared complications following bariatric surgery, carrying a significant risk of increased morbidity and mortality.
- Given the increasing number of bariatric conversions being performed nationally, we sought to identify risk factors associated with anastomotic leak following conversion bariatric surgery.

## Methods

- The Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database was queried for all patients undergoing conversion procedures during the years 2021 and 2022.
- Multivariate logistic regression was used to identify factors associated with anastomotic leak. 30-day postoperative outcomes were also assessed.

## Results

- 40,837 bariatric conversions were reported during the study period, of which 266 (0.65%) were found to have anastomotic leak.
- The most common conversion was sleeve gastrectomy (SG) to Roux-en-Y gastric bypass (RYGB) (20,491, 50.2%), followed by adjustable gastric band (AGB) to SG (7849, 19.2%), and AGB to RYGB (4963, 12.2%).
- The highest leak rates were seen in RYGB to SADI (6.14%), RYGB to SG (5.5%), and RYGB to Biliopancreatic diversion with duodenal switch (BPD/DS) (4.3%).

| | No Leak | | Leak | | |
|---|---|---|---|---|---|
| | n | % | n | % | p value |
| Age (n, SD) | 47.92 | 10.592 | 50.64 | 10.78 | <0.001 |
| BMI | 41.67 | 8.23 | 42.04 | 9.099 | 0.46 |
| A1C | 5.88 | 1.219 | 5.92 | 1.009 | 0.64 |
| Operative time | 139.22 | 69.385 | 186.87 | 97.599 | <0.001 |
| Pre-Op Functional Health Status | | | | | 0.227 |
| Independent | 40332 | 99.4 | 262 | 98.5 | |
| Partially dependent | 193 | 0.5 | 3 | 1.1 | |
| Totally dependent | 5 | 0.0 | | | |
| Unknown | 41 | 0.1 | 1 | 0.4 | |
| Pre-Op Diabetes Mellitus | | | | | 0.019 |
| No | 34530 | 85.1 | 210 | 78.9 | |
| Yes, insulin | 1508 | 3.7 | 14 | 5.3 | |
| Yes, non-insulin | 4533 | 11.2 | 42 | 15.8 | |
| Pre-Op Steroid/Immunosuppressant Use for Chronic Con | 1190 | 2.9 | 9 | 3.4 | 0.585 |
| Pre-Op history of COPD | 447 | 1.1 | 9 | 3.4 | 0.003 |
| History of PE | 787 | 1.9 | 16 | 6.0 | <0.001 |
| Pre-Op Sleep Apnea | 11200 | 27.6 | 90 | 33.8 | 0.026 |
| Pre-Op GERD | 24004 | 59.2 | 152 | 57.1 | 0.532 |
| Previous Foregut Surgery | 33946 | 83.7 | 240 | 90.2 | 0.004 |
| History of MI | 425 | 1.0 | 3 | 1.1 | 0.76 |
| Previous PCI/PTCA | 543 | 1.3 | 10 | 3.8 | 0.004 |
| Previous Cardiac Surgery | 339 | 0.8 | 2 | 0.8 | 1 |
| Pre-Op Hypertension | 16574 | 40.9 | 117 | 44.0 | 0.317 |
| Pre-Op Hyperlipidemia | 8586 | 21.2 | 75 | 28.2 | 0.006 |
| Pre-Op Venous Thrombosis Requiring Therapy | 960 | 2.4 | 20 | 7.5 | <0.001 |
| Pre-Op Therapeutic Anticoagulation | 1347 | 3.3 | 22 | 8.3 | <0.001 |
| Pre-Op Venous Stasis | 224 | 0.6 | 2 | 0.8 | 0.661 |
| Pre-Op IVC Filter | 144 | 0.4 | 2 | 0.8 | 0.246 |
| Pre-Op Renal Insufficiency | 150 | 0.4 | 1 | 0.4 | 1 |
| ASA Class | | | | | 0.957 |
| ASA I - Normal/Healthy | 54 | 0.1 | | | |
| ASA II - Mild systemic disease | 9196 | 22.7 | 57 | 21.4 | |
| ASA III - Severe systemic disease | 30201 | 74.4 | 203 | 76.3 | |
| ASA IV - Severe systemic disease threat to life | 1083 | 2.7 | 6 | 2.3 | |
| ASA V - Moribund | 3 | 0.0 | | | |
| None assigned | 34 | 0.1 | | | |

| | | 95% C.I. | | |
|---|---|---|---|---|
| | OR | Lower | Upper | p value |
| **Organ/Space SSI PATOS*** | **190.489** | **37.117** | **977.604** | **<0.001** |
| **Intra-Op or Post-Op Myocardial Infarction** | **65.682** | **12.160** | **354.787** | **<0.001** |
| **Intra-Op or Post-Op Cardiac Arrest Requiring CPR** | **14.655** | **4.267** | **50.330** | **<0.001** |
| **Transfusion Intra-Op/Post-Op (72h of surgery start time)** | **7.831** | **4.790** | **12.802** | **<0.001** |
| Pre-Op Functional Health Status | 3.256 | 0.422 | 25.115 | 0.257 |
| Pre-Op history of COPD | 2.166 | 0.989 | 4.744 | 0.053 |
| Pre-Op Venous Thrombosis Requiring Therapy | 1.822 | 0.951 | 3.489 | 0.070 |
| Previous PCI/PTCA | 1.650 | 0.641 | 4.248 | 0.299 |
| History of PE | 1.469 | 0.715 | 3.019 | 0.295 |
| Pre-Op Therapeutic Anticoagulation | 1.457 | 0.794 | 2.673 | 0.224 |
| Pre-Op Diabetes Mellitus | 1.437 | 0.981 | 2.103 | 0.062 |
| Revision/Conversion Emergency Case (Yes) | 1.176 | 0.192 | 7.189 | 0.861 |
| Robotic Assist (Yes) | 1.146 | 0.861 | 1.526 | 0.352 |
| Current smoker within one year (Yes) | 1.101 | 0.606 | 1.998 | 0.753 |
| Pre-Op Hyperlipidemia | 1.098 | 0.775 | 1.555 | 0.600 |
| Pre-Op Steroid | 1.056 | 0.518 | 2.155 | 0.881 |
| **Age (years)** | **1.022** | **1.008** | **1.037** | **0.002** |
| Pre-Op Sleep Apnea | 1.011 | 0.741 | 1.380 | 0.943 |
| Pre-Op BMI closest to bariatric surgery | 1.004 | 0.987 | 1.021 | 0.672 |
| Pre-Op Diabetes Mellitus | 0.956 | 0.468 | 1.954 | 0.902 |
| Pre-Op Renal Insufficiency | 0.819 | 0.105 | 6.370 | 0.849 |
| Pre-Op Albumin Lab Value (g/dL) | 0.819 | 0.586 | 1.146 | 0.244 |
| Pre-Op GERD | 0.785 | 0.593 | 1.038 | 0.090 |
| Pre-Op Hypertension | 0.772 | 0.567 | 1.052 | 0.101 |
| History of MI | 0.740 | 0.204 | 2.679 | 0.646 |
| Pre-Op Venous Stasis | 0.696 | 0.146 | 3.323 | 0.650 |
| Previous Cardiac Surgery | 0.512 | 0.118 | 2.222 | 0.371 |
| Urinary Tract Infection PATOS | 0.500 | 0.000 | 5978.081 | 0.885 |
| Pre-Op IVC Filter | 0.421 | 0.062 | 2.884 | 0.378 |

*PATOS: present at time of surgery

## Results

- Among the most frequent conversion procedures, leak rates were low: SG to RYGB (0.46%), AGB to SG (0.48%) and AGB to RYGB (0.64%).
- Factors predictive of anastomotic leak were organ space infection at time of reoperation (OR 190.5, 95% CI 37.1-977.6, p<0.001), myocardial infarction (OR 65.7, 95% CI 12.1-354.8, p<0.001), cardiac arrest requiring CPR (OR 14.67, 95% CI 4.27-50.3, p<0.001), and intra or post operative transfusion (OR 7.83, 95% CI 4.8-12.8, p<0.001).
- Several factors, such as preoperative diabetes mellitus and COPD, approached significance but were not conclusively associated.
- Anastomotic leak was associated with an increase in several 30-day outcome measures including reoperation, readmission, and reintervention.

## Conclusions and Clinical Implications

- Anastomotic leak following conversion bariatric surgery remains a rare, but serious complication associated with organ space infection at time of reoperation, myocardial infarction, cardiac arrest and perioperative transfusion.
- Both patient and procedural selection may be critical to reducing complication rates in conversion bariatric surgery.

## Disclosure Information

None