First assistant level of training as a predictor of perioperative outcomes in primary bariatric surgery, a MBSAQIP survey

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Background:

The purpose of this study was to investigate the impact of the first assistant level of training on outcomes in bariatric surgery. Surgical education is essential to maintaining a sustainable and efficient healthcare system. Despite this, there have been many studies that have demonstrated longer operative times, increased costs, and, in some studies, worse patient outcomes in patients undergoing interventions in teaching institutions vs non-teaching centers. Many bariatric programs exist in teaching hospitals and have surgeons-in-training available to assist; however, most rely on advance practice providers (APP) or surgical technicians (ST) as first assistants (FA). To our knowledge, no study has reviewed or compared surgical outcomes of patients undergoing bariatric surgery based on the level of training of the surgical first assistant.

Methods

MBSAQIP database utilized to investigate if the level of FA training correlated to perioperative outcomes. Patients from 2015-2018, ≥ 18 years old, who underwent primary bariatric surgery were included. The primary outcome was perioperative mortality. Secondary outcomes included post-operative surgical site infections (SSI), conversion to open surgery, cardiovascular (CV) event, re-admissions, non-operative reintervention, and re-operation.

Outcome	APP OR (95% CI)	P	Resident OR (95% CI)	P	Fellow OR (95% CI)	P	Attending other OR (95% CI)	P	Bariatric attending OR (95% CI)	P
SSI	1.13 (1.04-1.25)	0.005	1.26 (1.14-1.40)	<0.001	1.81 (1.62-2.02)	<0.001	1.02 (0.87-1.17)	0.9	1.14 (1.02-1.2)	0.015
CV event	1.42 (0.94-2.16)	0.1	1.98 (1.27-3.07)	0.002	1.97 (1.18-3.27)	0.009	0.78 (0.36-1.71)	0.5	1.3 (0.8-2.13)	0.29
Readmission	1.07 (1.02-1.11)	0.001	1.25 (1.20-1.30)	<0.001	1.32 (1.26-1.39)	<0.001	0.99 (0.93-1.06)	0.81	1.09 (1.04-1.14)	<0.001
Sepsis	0.95 (0.79-1.15)	0.6	1.29 (1.05-1.59)	0.014	1.62 (1.29-2.04)	<0.001	0.73 (0.52-1.04)	0.082	1.04 (0.83-1.30)	0.7
Conversion to open	0.93 (0.76-1.13)	0.45	1.24 (1.01-1.55)	0.043	1.14 (0.87-1.49)	0.33	0.88 (0.62-1.24)	0.45	0.99 (0.78-1.25)	0.9
Nonop re-intervention	1 (0.94-1.07)	0.9	1.21 (1.12-1.30)	<0.001	1.29 (1.19-1.41)	<0.001	0.9 (0.81-1.01)	0.079	1 (0.93-1.09)	0.92
Re-operation	1.04 (0.97-1.11)	0.26	1.07 (1.00-1.15)	0.062	1.19 (1.09-1.30)	<0.001	0.89 (0.79-0.99)	0.038	1.11 (1.03-1.20)	0.008
Mortality	0.99 (0.77-1.26)	0.91	1.23 (0.94-1.61)	0.127	1.07 (0.77-1.49)	0.688	1.09 (0.74-1.61)	0.45	1.11 (0.83-1.47)	0.479

Table 1: As compared to no assist, using APP, residents and fellows as FA was not associated with higher odds of mortality. There were higher odds of SSI (OR 1.13, 1.26, and 1.81 respectively), cardiovascular events (OR 1.30, 1.81, and 1.75), readmission (OR 1.06, 1.25, and 1.32). While resident and fellow FAs were associated with higher odds of sepsis (OR 1.29 and 1.61 respectively), conversion to open surgery (OR 1.25 and 1.14), nonoperative reintervention (OR 1.21 and 1.29) and fellow acting as FA was associated with higher odds of reoperation (OR 1.19).

Table 2: *A multi-variate regression analysis was performed looking between groups the account for patient co-morbidities including previous MI, age >65, BMI >40, smoker, DM, and history of COPD (tables 5 and 6). When accounting for these variables, there remained higher odds of SSI with APP, resident, and fellow as FA (OR 1.13, 1.26, and 1.78 respectively) but the differences were no longer significant for CV event or sepsis. Odds of Non-op reintervention remained significant for resident and fellow FA (OR 1.21 and 1.28 respectively) but not for APP (OR 1.00). Odds of reoperation within 30 days remained significant for resident and fellow (OR 1.08 and 1.19 respectively) but not for APP (OR 1.04). Having a bariatric surgeon as FA demonstrated increased odds of 30 day reoperation (OR 1.11). Odds of conversion to open remained higher in the resident FA group (OR 1.26) but not fellow FA (OR 1.12).*

Table 2

Outcome	APP OR (95% CI)	P	Resident OR (95% CI)	P	Fellow OR (95% CI)	P	Attending other OR (95% CI)	P	Bariatric attending OR (95% CI)	P
SSI	1.13 (1.03-1.24)	0.008	1.26 (1.14-1.39)	<0.001	1.78 (1.59-1.99)	<0.001	1.02 (0.87-1.18)	0.87	1.14 (1.02-1.28)	0.013
Conversion to open	0.92 (0.76-1.13)	0.45	1.26 (1.01-1.57)	0.039	1.12 (0.85-1.46)	0.416	0.89 (0.63-1.25)	0.508	1 (0.78-1.26)	0.972
Nonop re-intervention	1 (0.94-1.07)	0.97	1.21 (1.12-1.30)	<0.001	1.28 (1.18-1.40)	<0.001	0.91 (0.81-1.02)	0.097	1.01 (0.93-1.09)	0.88
Re-operation	1.04 (0.97-1.11)	0.271	1.08 (1.002-1.16)	0.04	1.09 (1.09-1.30)	<0.001	0.89 (0.79-1.00)	0.05	1.11 (1.03-1.20)	0.006

Conclusions

The impact of the FA in bariatric surgery is not well defined but there seems to be a correlation of FA with perioperative outcomes. Specifically this paper demonstrates an association with surgical site infection, cardiovascular events, readmission, sepsis, conversion to open surgery, non-operative re-intervention, and re-operation.

While we have demonstrated an association, we have in no way demonstrated any causation. The importance of graduated responsibility for surgical trainees is hard to quantify and can not be overlooked as it pertains to both to our health care system and society as a whole

Further study is needed to determine whether the training level of a FA has a direct impact on perioperative outcomes.