Can robotics narrow the access disparities in Minimally Invasive Surgery?

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Introduction

The introduction of robotic assisted surgery (RAS) has increased the rates of MIS, but it is unknown whether this introduction has contributed to the narrowing of existing access disparities. We assessed whether the introduction of RAS has decreased access disparities to MIS amongst under-served patient groups for common general surgery (CGS) procedures

Methods

Adult patients undergoing CGS procedures (cholecystectomy, inguinal hernia repair, ventral hernia repair, and colorectal resection) from 2016 to 2022 were identified using the PINC AI™ Healthcare Database. Hospitals associated with these patient encounters were characterized by those that did and did not have RAS capabilities which was determined by having at least one CGS procedure by RAS.

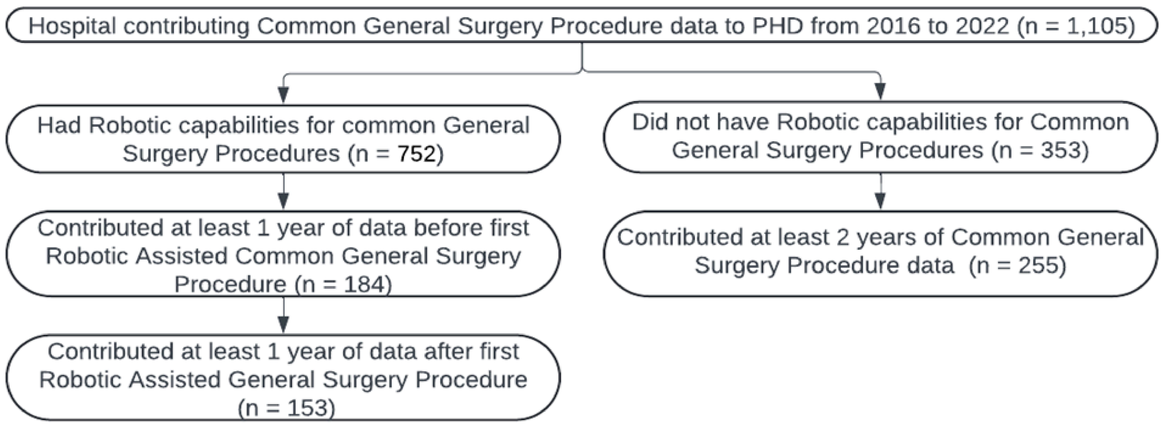

Figure 1: Study cohort formation

Disparities were examined across: sex, age, race, and payor type using Generalized Estimating Equation (GEE) regression models with a time-by-demographic interaction term. If the post-index RR was closer to 1 than the pre-index RR, we concluded that MIS access disparities decreased for that characteristic.

For more information about this study or specific questions please contact Dr. Wall-Wieler at elizabeth.wall-wieler@intusurg.com

Results

Among the 408 hospitals, 153 (38%) hospitals introduced RAS while 255 (62%) did not.

Table 1: Relative rates of MIS before and after hospitals introduced RAS (n = 153)

Characteristic	Comparison	Pre-Index RR (95% CI)	Post-Index RR (95% CI)	Interaction p-value
Age	'18-34' vs '35-44'	1.17 (1.14, 1.21)	1.11 (1.08, 1.15)	0.02
	'18-34' vs '45-64'	1.34 (1.30, 1.39)	1.28 (1.24, 1.33)	0.03
	'18-34' vs '65+'	1.61 (1.54, 1.69)	1.43 (1.37, 1.48)	<0.01
Sex	Females vs Male	1.44 (1.38, 1.50)	1.32 (1.27, 1.37)	<0.01
Race	White vs Black	1.04 (0.98, 1.10)	1.00 (0.94, 1.05)	0.28
	White vs Asian	0.77 (0.72, 0.83)	0.87 (0.81, 0.94)	0.01
Payor Type	Commercial vs Medicaid	0.94 (0.91, 0.98)	0.97 (0.95, 1.00)	0.17
	Commercial vs Medicare	1.26 (1.22, 1.31)	1.21 (1.17, 1.25)	0.05

Table 2: Relative rates of MIS before and after the index date in hospitals that did not introduce RAS (n = 255)

Characteristic	Comparison	Pre-Index RR (95% CI)	Post-Index RR (95% CI)	Interaction p-value
Age	'18-34' vs '35-44'	1.15 (1.10, 1.19)	1.24 (1.20, 1.30)	<0.01
	'18-34' vs '45-64'	1.38 (1.34, 1.44)	1.42 (1.37, 1.47)	0.27
	'18-34' vs '65+'	1.68 (1.59, 1.76)	1.69 (1.61, 1.78)	0.08
Sex	Females vs Male	1.72 (1.62, 1.81)	1.64 (1.57,1.73)	<0.01
Race	White vs Black	0.98 (0.92, 1.05)	0.99 (0.92,1.07)	0.89
	White vs Asian	1.24 (1.12, 1.38)	1.25 (1.13, 1.39)	0.87
Payor Type	Commercial vs Medicaid	0.93 (0.89, 0.96)	0.93 (0.89, 0.97)	0.99
	Commercial vs Medicare	1.29 (1.24, 1.35)	1.28 (1.22,1.33)	0.61

Access disparities decreased across sex, age, and race in hospitals that introduced RAS, but not in hospitals that did not introduce RAS. This indicated that RAS introduction was associated with reduced MIS access disparities.

Conclusion

Although disparities persist, the narrowing of their magnitude underscores the importance of emerging technology in expanding access to MIS in specific underserved groups.