First 100 Robotic Cases and Implementation of a Robotics Curriculum in a General Surgery Residency

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The Setting, The Idea

Kern Medical is a safety-net hospital located in Bakersfield, CA. It serves a population of over 900,000 and is the home of multiple residencies, including General Surgery. The use of robotic technology is rapidly increasing among general surgeons but is not being routinely taught in general surgery residency.

We aimed to evaluate our first 100 robotic cases during which time we developed a robotic surgery curriculum incorporating residents.

How It Was Done

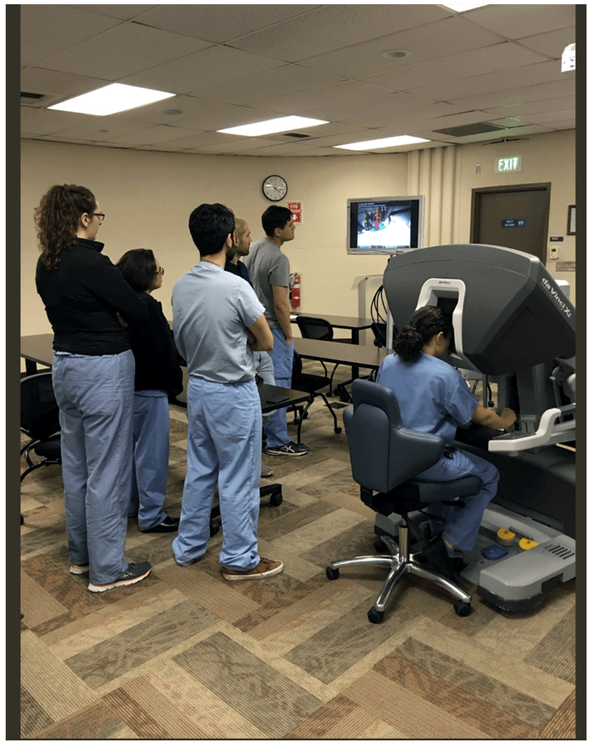
The first 100 robotic cases performed by two surgeons at our institution from 2016 - 2017 were analyzed. A residency curriculum was developed and instituted after the first 6 months.

The curriculum for residents consisted of the following steps:

- Completion of online modules, offered by Intuitive Surgical
- Mastery of a number of training modules available on the da Vinci Xi training simulator. These included the Camera Targeting, Peg Board 2, Energy Switching 1, Ring Walk 2, Thread the Rings, and Suture Sponge 2. A score of 90% or better was required to pass.
- Hands-on workshops for cannula placement, docking, instrument exchange, camera clutching and other introductory tasks.

A review of operative cases was conducted. This noted patient demographics, type of procedure, resident involvement (yes/no), total operative and console times, comorbid conditions, and complications. Unpaired t-tests were performed for statistical analysis.

Resident Training



The First 100 Cases

	Cholecystectomy	Sleeve Gastrectomy	RYGB	Revisional bariatric	Inguinal hernia	Ventral hernia	Paraesophageal hernia	Heller myotomy
# of Cases	30	22	5	4	18	16	4	1
Resident Involvement	67% (20/30)	55% (12/22)	40% (2/5)	50% (2/4)	22% (4/18)	38% (6/16)	25% (1/4)	0
Total OR time without resident (min)	58 ±19	91 ±28	193 ±29	230±12	155 ±75	172±82	277 ±93	99
Total OR time with resident (min)	64 ±34	111±28	214 ±23	119 ±6	127 ±42	179±64	250	n/a
p value	0.5	0.1	0.5	0.007	0.5	0.8	0.7	
Console Time without resident (min)	24 ±10	44±9	130 ±9	156 ±13	94 ±49	116±64	218 ±86	50
Console time with resident (min)	34 ±28	65 ±22	104±44	56 ±2	75 ±32	126±53	196	n/a
p value	0.16	0.01	0.4	0.008	0.5	0.7	0.7	

Results

The first 100 patients were 66 females and 34 males, with average age of 44 years ±12. The majority of patients (71%) had comorbidities, with a predominance of hypertension and diabetes. The bariatric patients had an average BMI of 48±10.

A variety of procedures were performed including hernias, foregut, and bariatric. Residents participated in 40% of cases. There were no differences in total operative and console times in cases with residents except bariatric procedures. There were three complications in this series: postoperative ileus, gallbladder fossa hematoma, and an enterotomy. There was one early conversion to open in a complex foregut case and no deaths.

In Conclusion

The implementation of a robotic surgery program and resident curriculum at our safety-net community hospital was safe with similar outcomes related to operative times and complications. As robotics continues to grow, residencies should have a curriculum incorporated. Further data is needed to determine residency learning curves between robotics and laparoscopy.

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