First 100 Clinical Cases with the Magnetic Assisted Robotic Surgery Platform: A Groundbreaking New Surgical Technology

Ignacio Robles MD1, Andrew T. Strong MD6, Julio Jimenez MD2, Juan Fulla MD4, Pablo Marin MD3, Marcelo Yanez MD2, Matthew Kroh MD6

1Hospital Fach, Clinica Indisa, Santiago, Chile, 2Hospital Luis Tisne, Santiago, Chile, 3Clinica Colonial, Santiago, Chile, 4 Hospital San Borja, Santiago, Chile, 6 Cleveland Clinic, OH USA

INTRODUCTION

- Surgeon's are constantly searching for technologies to improve patient outcomes and improve OR efficiency.
- It is a very exciting times in surgery, as novel technologies such as magnetics, robotics, artificial intelligence, and augmented reality will shape the procedures in the near future.
- The Magnet-Assisted Robotic Surgery (MARS) platform developed by Levita Magnetics (Mountain View, CA, USA) created a new category in surgery, combining magnets and robotics, to increase the benefits of minimally invasive surgery. It was recently FDA cleared.
- This novel surgical platform is designed to further reduce invasiveness (with reductions in incisions, pain and recovery time) while improving surgeon visualization and control.
- The present work describes the first 100 clinical cases of the use of this novel surgical platform in a wide array of indications.

DESCRIPTION OF THE TECHNOLOGY

- The MARS platform enables surgeon control of an external magnetic controller and a laparoscopic camera using two seven-degrees-of-freedom robotic arms. The external magnet transabdominally manipulates an internal grasper used to provide tissue retraction. The second arm allows direct control of the laparoscopic camera. The system is console-free, with the arms manipulated by a foot controller, allowing the surgeon to remain next to the patient in the sterile field and minimizing the equipment footprint. The MARS platform was recently cleared for commercialization by the United States Food and Drug Administration. .

RESULTS (N=100 PATIENTS)

- The objective was to analyze the clinical performance of the MARS platform in reduced-port laparoscopic procedures. The sample for this study combines two open label clinical trials (ClinicalTrials.gov # 05353777 and #05695989; n=66), with initial clinical experience post commercial approval at hospitals in Santiago, Chile (n=24), and Cleveland, United States (n=10). Local IRB approval was obtained and all patients signed an informed consent if participating in the clinical trials.

	Pre FDA	Post FDA	Total
Bariatrics	28	14	42
Cholecystectomy	23	20	43
Radical/ and partial nephrectomy	12		12
Adrenalectomy	3		3

SAFETY AND EFFICACY OF MAGNETIC RETRACTION

Severe device related adverse event	0
Reduced Port Technique- %	100%

CONCLUSION

- This study demonstrates that the combination of magnetic and robotic technologies in one integrated system are safe and effective. The results of this initial clinical experience open new opportunities in the evolution of surgery and demonstrate that MARS offers benefit performing a wide variety of abdominal procedures. The potential clinical benefits (less pain and faster recovery) plus the operational benefits (more surgeon control and smaller footprint) allow surgeons to maximize the advantages of minimally invasive surgery.





