Medtronic

Clinical Investigation Plan

Clinical Investigation Plan/Study Title	A prospective, single-center, single-arm, pivotal trial to evaluate safety and effectiveness of the Medtronic Hugo™ Robotic Assisted Surgery (RAS) system in prostatectomy or cholecystectomy
Clinical Investigation Plan Identifier	MDT21028
Study Product Name	Medtronic Hugo™ Robotic Assisted Surgery (RAS) System
Sponsor/Local Sponsor	Medtronic Korea Ltd. Glass Tower, 17F, 534 Teheran-ro, Gangnam-gu, Seoul, Korea 06181
Document Version	V6.0

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1. Glossary

Term	Definition
ADE	Adverse Device Effect
AE	Adverse Event
AJCC	American Joint Committee on Cancer
ASA	American Society of Anesthesiologists
BMI	Body Mass Index
CIP	Clinical Investigation Plan
CRF	Case Report Form
CRIS	Clinical Research Information Service
CTA	Clinical Trial Agreement
DD	Device Deficiency
ERCP	Endoscopic retrograde cholangiopancreatography
FAS	Full Analysis Set
GS	General Surgery
IC	Informed Consent
ICF	Informed Consent Form
IRB	Institutional Review Board
KGCP	Korean Good Clinical Practice
KUB	Kidney, Ureter and Bladder
MAOI	Monoamine Oxidase Inhibitor
MedDRA	Medical Dictionary for Regulatory Activities
MFDS	Ministry of Food and Drug Safety
OR	Operating Room
PPS	Per Protocol Set
PSA	Prostate Specific Antigen
RAS	Robotic Assisted Surgery
SADE	Serious Adverse Device Effect
SAE	Serious Adverse Event
SOP	Standard Operating Procedure
UADE	Unanticipated Adverse Device Effect
USADE	Unanticipated Serious Adverse Device Effect

2. Synopsis

Version	V6.0 (2023-04-03)
Study Title	A prospective, single-center, single-arm, pivotal trial to evaluate safety and effectiveness of the Medtronic Hugo™ Robotic Assisted Surgery (RAS) system in prostatectomy or cholecystectomy
Investigational Device	Product Name: Hugo™ RAS System Product Code/Class: Robotic surgical system, navigation (A67050.04), Class III License Holder: Medtronic Korea Ltd. (Manufacturer: Plexus Corp) Intended Use: The Hugo™ RAS System is intended to assist in the accurate control of instruments and accessories including rigid endoscopes, blunt and sharp endoscopic dissectors, scissors, forceps/graspers, needle holders, endoscopic retractors, electrosurgical tools and accessories for endoscopic manipulation of tissue, including grasping, cutting, blunt and sharp dissection, approximation, ligation, electrosurgery, and suturing during urologic and general endoscopic (laparoscopic) surgical procedures including prostatectomy and cholecystectomy.
Sponsor	Medtronic Korea Ltd. Glass Tower, 17F, 534 Teheran-ro, Gangnam-gu, Seoul, Korea 06181
Principal Investigator(s)	Prof. Jin-Young Jang (Dept. of Hepatobiliary and Pancreatic Surgery, Seoul National University Hospital)
Indication under Investigation	Patients have been indicated for a radical prostatectomy or cholecystectomy [Rationale for study indication] This trial will collect patient data undergoing two representative procedures in robotic surgery field to minimize potential confounding effect due to surgeon's proficiency, or learning curve. To be specific, indications under the study include one procedure each in the non-general surgery (GS) specialty (e.g., prostatectomy) and the GS specialty (e.g., cholecystectomy). - Prostatectomy: The number of prostatectomy has been increased in recent years, upon prevalence increase of prostate cancer in Korea. Robot-assisted prostatectomy has been preferred over open, or laparoscopic prostatectomy in Korea. According to report from the National Evidence-based Healthcare Collaborating Agency in 2013, prostatectomy is the most frequently performed robotic procedure in Korea. - Cholecystectomy: According to the Main Surgery Statistical Yearbook 2019, cholecystectomy is the fifth most frequently performed surgery in Korea (84,500 cases as of 2019) so that there are many patients who can get therapeutic benefits through product approval. Furthermore, since the effectiveness of robotic cholecystectomy has been proven from clinical data of

	commercialized products such as da Vinci and Revo-i, there will be minimal impact on the product safety and effectiveness from factors other than the product itself, such as surgeon's proficiency in robot-assisted procedures.
Study Purpose	This study aims to evaluate the safety and effectiveness of the Medtronic Hugo™ RAS System when used for prostatectomy or cholecystectomy.
Study Design	Prospective, single-center, single-arm, pivotal trial
Study Duration	9 months after protocol approval - IRB submission and site activation: 3 months - Subject enrollment to follow-up completion: 3 months - Statistical analysis and report writing: 3 months
Sample Size	At least 40 patients (20 radical prostatectomy, 20 cholecystectomy patients) [Sample size determination] To estimate the number of sample size, two things are taken into account: The number of subjects from previous studies, and the minimum number to show whether the primary objective is met. We plan to include 40 patients (20 prostatectomy patients, and 20 cholecystectomy patients) for the study. The sample size is greater than the minimum analyzable number of subjects. The study will be considered successful when the point estimate of the completion rate is greater than or equal to 95%.
Inclusion/Exclusion Criteria	**Inclusion Criteria** 1) Adult subjects (22 years old or greater) who are willing to participate and provide informed consent 2) Subjects indicated for a radical prostatectomy or a cholecystectomy - Prostatectomy: Male patients requiring radical prostatectomy for clinically localized prostate cancer * Clinically localized prostate cancer is defined as following: biopsy-proven prostate adenocarcinoma, clinical staged as T1-T2N0M0 upon standard imaging findings such as bone scan, MRI, or CT - Cholecystectomy: Patients requiring cholecystectomy for cholelithiasis, cholecystitis, or gallbladder polyps * For gallbladder polyps, only followings will be considered: gallbladder polyps ≥10 mm, enlarging polyps, or symptomatic gallbladder polyps **Exclusion Criteria** 1) Patient with a considerable risk for laparoscopic surgery (e.g., severe cardiopulmonary diseases which contraindicated to general anesthesia, uncontrolled coagulopathy, etc.) 2) Patients requiring urgent surgery 3) Pregnant or lactating women

	4) Patients with either of followings: - Prostatectomy: Metastatic prostate cancer or estimated life expectancy less than 10 years - Cholecystectomy: Severe liver cirrhosis (Child-Pugh class C) with portal hypertension, suspicion of gallbladder cancer 5) Previous abdominal surgery (open or laparoscopic) within 2 years before enrollment 6) Concurrent participation in another clinical study that may confound study results 7) Patient has a condition that could compromise study compliance (e.g., mentally incompetent, alcohol or drug abuse) as determined by the investigator 8) Subjects who are considered unsuitable to conduct the trial as determined by the investigator
Study Procedures	The study visits include baseline visit, admission (surgery to discharge), and follow-up visit after discharge: - Baseline: To determine study eligibility and collect baseline information (demographics, medications, medical history, surgical history, etc.) - Surgical procedure: To re-confirm eligibility criteria, procedure set-up and take-down, medication changes, intraoperative complication evaluation, disease state evaluation, procedure success, conversion rates, protocol deviation, adverse event evaluation, and device deficiency collection - Up to hospital discharge: Adverse event evaluation, complication rate, disease state evaluation, medication changes and protocol deviation - Follow-up after discharge: Adverse event evaluation, complication rate, disease state evaluation, length of hospital stay, readmission (if applicable), reoperation (if applicable), medication changes, protocol deviation and study exit Prior to subject enrollment, investigators who participate in surgical procedure will be properly trained on the investigational device. When a subject provides written informed consent, the principal investigator reviews the subject's medical records and confirms the eligibility criteria. The subject will be hospitalized and prepped for surgery according to site standard practices. On the day of surgery (Day 0), robot-assisted prostatectomy or cholecystectomy using Hugo™ RAS System is performed according to patient's indication. Intraoperative complication during the surgery will be monitored. For prostatectomy subjects, pathological examination on the resected specimen shall be performed.

<table>
<tr><td></td><td>Subjects will be followed through 30-day post-operative visit. Prostatectomy subjects will be followed at the day of discharge, 7-, 14-, and 30-day post-operative visits. Cholecystectomy subjects will be followed at the day of discharge, and 30-day post-operative visit. Post-operative complications will be evaluated. Subject's study participation will be terminated when the subject expires, is lost to follow-up, or at the last follow-up visit (whichever occurs first).</td></tr>
<tr><td>Study Assessments and Endpoints</td><td>Study Assessments
Following information will be collected during the study.
<table>
<tr><th>Category</th><th>Measurements</th></tr>
<tr><td>Demographics</td><td>Sex, date of birth, height, weight, BMI</td></tr>
<tr><td>Medical history</td><td>Comorbidities, past surgical history, family history, ASA class</td></tr>
<tr><td>Laboratory tests</td><td>Blood test</td></tr>
<tr><td>Vital signs</td><td>Vital signs (blood pressure, pulse rate, respiration rate, body temperature),</td></tr>
<tr><td>Indication under study</td><td>Indication for robotic surgery, date of diagnosis
[Prostatectomy] Prostate volume, Biopsy Gleason score, PSA, clinical stage, prior neoadjuvant hormonal therapy
[Cholecystectomy] Concomitant bile duct stones, ERCP</td></tr>
<tr><td>Device/Procedure information</td><td>Device identification, setup time, console time, total operative time, takedown time, estimated blood loss, conversion to open/laparoscopic surgery, blood transfusion, date of admission, date of discharge, changes to port placement, delay in robot setup time, delay in total operative time
[Prostatectomy] Pelvic lymph node dissection, nerve-sparing, date of urinary catheter removal
[Cholecystectomy] Amount of gallbladder adhesions, concomitant gallbladder stones, type of gallbladder polyps, acute cholecystitis, other concomitant procedures, use of drainage tube, date of drain removal</td></tr>
<tr><td>Pathological exam</td><td>[Prostatectomy] Pathological stage, tumor size, positive surgical margin</td></tr>
</table></td></tr>
</table>

	<table><tr><td>Post-operative imaging findings (collected only if it is related to adverse events)</td><td>[Prostatectomy] chest X-ray, abdomen X-ray, KUB X-ray, and cystography findings</td></tr><tr><td>Medication</td><td>Study-related prior/concomitant medication, indication</td></tr><tr><td>Safety information</td><td>Any adverse events (including post-operative complications), device deficiencies</td></tr></table> **Study Endpoints** <u>- Primary endpoint</u> 1) Completion rate (A proportion of subjects who completed the surgery without conversion (to laparoscopic or open surgery) due to system serious malfunction, and without any major complications within 24-hour post-surgery) * Major complication is defined as Clavien-Dindo grade ≥3 <u>- Secondary endpoints</u> 1) Overall complication rate through 30-day post-surgery: A proportion of subjects with any post-operative complication within 30-days post-surgery using the investigational device 2) Major complication rate through 30-day post-surgery: A proportion of subjects with any post-operative complication classified ≥3 by the Clavien-Dindo system within 30-days post-surgery using the investigational device 3) Readmission rate through 30-day post-surgery: A proportion of subjects hospitalized within 30 days post-surgery 4) Reoperation rate through 30-day post-surgery: A proportion of subjects go through reoperation for the same indication within 30 days post-surgery 5) Device deficiency rate: A proportion of subjects with any device deficiency during robotic assisted surgery using the investigational device
Statistical Analysis	**General Aspects of Analysis** The statistical analysis will be performed respectively on all subjects treated with the investigational device (Full analysis set) and subjects completed the study per the clinical investigation plan (Per protocol set). The full analysis set will be the primary analysis set for the primary and secondary endpoints. Descriptive summary will be provided: number of subjects (n), mean, standard deviation, median, and range for continuous variables, and frequency, percentage for categorical variables. If necessary, continuous variables will be grouped into several categories for descriptive summary. If applicable, power of 80%, and significance level of 5% (two-sided) will be used for statistical test, unless otherwise specified. Data analysis will be performed using SAS for

	Windows (version 9.4 or higher, SAS Institute Inc. Cary, NC) or other widely accepted statistical or graphical software. **Statistical Analysis** 1) Pre-operative characteristics: Demographics, medical history, vital signs, laboratory values, ASA class, etc. will be summarized using descriptive statistics. 2) Surgical data: Setup time, console time, operative time, takedown time, estimated blood loss, conversion to open/laparoscopic surgery, blood transfusion during the surgery, length of hospital stay, delay in setup time, and delay in total operative time will be summarized. 3) Primary endpoint: The Clopper-Pearson Exact test for single proportion will be conducted. The number of subjects successfully completed the surgical procedure, percentage, and its 95% confidence interval will be summarized. If the point estimate of the completion rate is greater than or equal to the pre-determined value (i.e., 0.95), it is considered that the primary objective is met. 4) Secondary endpoints: Descriptive statistics will be used. Frequency, percentage, and its 95% confidence interval will be presented for each endpoint. The Clopper-Pearson Exact test with 95% confidence interval for single proportion will be conducted. 5) Other pre-specified measures: Adverse event rate will be summarized. Adverse events during the study period will be summarized by MedDRA term (system organ class and preferred term). For prostatectomy subjects, pathological findings will be also presented.

Data collection and study procedure requirements of subject visits

Procedure/Assessments	Baseline	Surgery	Discharge	Follow-up[1)]		
	-28D~0D	0D	0D~Day of discharge	7D (±3D)[2)]	14D (±3D)[2)]	30D (±7D)
Informed consent	X					
Eligibility check	X					
Demographics	X					
Medical history	X					
Laboratory tests[3)]	X		X[4)]		X	X
Vital signs	X	X	X[4)]		X	X
Indication under study[5)]	X					
Procedure information[5)]		X				
Device deficiency		As they occur				
Pathological exam[6)]			X			
Post-operative imagings[7)]			X	X		
Medication[8)]	X	X	X	X	X	X
Adverse event[9)]	As they occur					
Protocol deviation	As they occur					
Readmission/Reoperation				As they occur		
Study Exit						X

1) If any unscheduled visit occurs other than planned follow-up visit, subject's data (e.g., adverse event, medication, etc.) can be collected if applicable.
2) Applicable for prostatectomy subjects only.
3) Laboratory tests include complete blood cell and serum chemistry.
4) Timing of laboratory tests and vital sign assessments up to discharge will be immediately after surgery (Day 0; laboratory tests only), Day 1, and Day 3 for prostatectomy subjects, and Day 1 for cholecystectomy subjects.
5) Procedure-specific information will be collected each for prostatectomy or cholecystectomy.
6) Applicable for prostatectomy subjects only.
7) Applicable for prostatectomy subjects only. Post-operative imaging includes chest X-ray (AP view), abdomen X-ray (Supine or erect view), KUB X-ray, and cystography. The cystography will be conducted on Day 7, while other radiographs will be obtained on immediately after surgery (Day 0; except KUB X-ray), Day 1, and Day 3. Post-operative imaging findings will be only collected to in the CRF if it is related to adverse events.
8) Following study-related medications will be collected: Pre-procedure anticoagulants or monoamine oxidase inhibitors (which may affect hemostasis) within 30 days prior to surgery, any relevant medication related to the study indication, pain medications due to an adverse event, medications given as treatment for an adverse event. Medication will be coded using WHO Drug Dictionary.
9) Adverse events will be collected after subject has agreed to participate and provided the written informed consent.

3. Investigators and Study Administrative Structures

3.1. Investigation Site

Site	Address	Contact
Seoul National University Hospital	101, Daehak-ro Jongno-gu, Seoul 03080, Korea	+82-1588-5700

3.2. Principal Investigator

Role	Name	Department	Title	Contact
Principal Investigator	Jin-Young Jang	Hepatobiliary and Pancreatic Surgery	Professor	+82-2-2072-2318

3.3. Sponsor

Company Name	Address	Contact
Medtronic Korea Ltd.	17F, 534 Teheran-ro, Gangnam-gu, Seoul 06181, Korea	+82-2-3404-3600

4. Background and Objectives

4.1. Background

Laparoscopic surgery, has the advantage of less pain and shorter hospital stay compared to open surgery as it enables to minimize incision length. However, laparoscopic approach has drawbacks such as limited field of view, weak feeling of contact, and learning curve for surgeons. Advancement in medical technology such as robot-assisted surgery (RAS) empowered surgeon to overcome these challenges, with 3-dimensional vision and better movements with improved degrees of freedom, during operational procedure [1]. The safety and performance of commercially available RAS systems have been evaluated in previous literature showing that robotic-assisted surgery was comparable or superior to open or traditional laparoscopic surgery in terms of length of hospital stay, complication rate, intraoperative blood loss, and intraoperative conversion rate.

In Korea, the first robotic surgery was performed in 2005 and several robotic surgery devices (e.g., da Vinci® Surgical System, Revo-i) are commercially available. According to National Evidence-based Healthcare Collaborating Agency report in 2010, robotic assisted surgery has been widely performed in urological procedures (e.g., prostatectomy, nephrectomy, cystectomy, etc.) and general surgery procedures (e.g., cholecystectomy, gastrectomy, colectomy). As of 2018, annual robotic procedure volume was 20,000 cases [2, 3].

The Medtronic Hugo™ RAS System is a modular robotic platform for performing robotically assisted minimally invasive surgery. Preclinical studies demonstrate that the Hugo™ RAS Platform performs as intended when used for partial nephrectomy, radical prostatectomy (pelvic lymphadenectomy), radical cystectomy (ureteroneocystostomy), and radical hysterectomy/myomectomy (ovariohysterectomy).

Pre-clinical studies were conducted using 36 Yorkshire swine to evaluate the safety and performance of the Hugo™ RAS System (4 groups of 6 pigs per type of urological and gynecological procedures, 2 groups of 6 pigs per type of general surgery procedures). The studies met all pre-defined criteria, as evidence by successfully completing all procedures using the Hugo™ RAS System across all surgical models with no occurrence of a serious adverse event. Furthermore, necropsies of the animals show no signs of device-related findings or adverse events (e.g., bleeding). The results of the pre-clinical studies are summarized below.

Table 1. Summary of Pre-Clinical Studies on the Hugo™ RAS System

Group No. (# of animals)	Procedure	Results[1)]			
		Procedure time (hh:mm)[2)]	Estimated blood loss (mL)	Malfunction recovery time (min)	Tissue damage due to electrosurgical instruments
Urologic and gynecological procedures					
1 (N=6)	Ureteroneocystostomy	00:55~01:15 (Total operative time: 01:46~02:19)	2~10	<1~9	None
2 (N=6)	Ovariohysterectomy	00:23~00:55 (Total operative time: 01:11~01:48)	2~25	<1~3	None
3 (N=6)	Partial nephrectomy	00:45~01:24 (Total operative time: 01:33~02:14)	<5~100	<1~23	None
4 (N=6)	Pelvic lymphadenectomy	01:05~01:24 (Total operative time: 01:47~02:16)	1~<5	≤1	None
General surgery procedures					
1 (N=6)	Partial descending colectomy and pelvic lymphadenectomy	00:38~00:55 (Total operative time: 00:54~01:21)	2~5	<1~6	None
2 (N=6)	Nissen fundoplication followed by gastrectomy, gastrojejunostomy, and jejunojejunostomy	01:05~01:34 (Total operative time: 01:21~02:00)	<10~50	<1~10	None

1) The study was considered successful if:
- Instruments could be used to perform the specified surgical tasks successfully with no device related serious adverse events.
- No serious adverse events that originated from a device related malfunction presented during the intra-operative or post-operative period that inhibited the recovery of the animal.
- The RASD manipulated tissue and surgical sites appeared healed at the time of necropsy as assessed by a qualified person (board-certified veterinary pathologist).

2) Procedure time is defined as time between the start of the surgical procedure to the completion of the surgical procedure.

The Hugo™ RAS System was tested using human cadaver models to evaluate the system performance intraoperatively across a range of tasks and surgical working volumes. Procedures selected to evaluate system performance were chosen for complexity in the given specialty. These more complex procedures are referred to as Umbrella procedures. Covered procedures have less complexity and risk for the specialty. For example, Cholecystectomy is a covered procedure under the umbrella procedures for Roux-en-Y Gastric Bypass and Nissen Fundoplication. Thus, successful clinical application of the umbrella procedures also demonstrate success in covered procedures of less complexity and risk. A total of 42 procedures were performed including urological, gynecological, and general surgery procedures. The results demonstrate that the Hugo™ RAS System met all pre-defined criteria – the surgeon was able to perform the surgical procedure in an acceptable time and with acceptable system performance. The results of the cadaveric studies are summarized below.

Table 2. Summary of Cadaveric Studies on the Hugo™ RAS System

Procedure[1)]	# of samples[2)]	Results			
		Procedure time (min)	Surgical downtime (min)	Malfunction exceeding 15 min. (single) or 30 min. (cumulative)	Acceptance criteria for customer requirements[3)]
Radical prostatectomy	N=6	95.2	1.2	None	PASS
Nephrectomy (Partial/Radical) with lymph node dissection	N=6	99.8		None	PASS
Radical hysterectomy	N=6	89.3		None	PASS
Roux-en-Y Gastric Bypass	N=3	112.7	3.4	None	PASS
Nissen fundoplication	N=3	42.3		None	PASS
Ventral Hernia Repair	N=6	43.8		None	PASS
Lower Anterior Resection (LAR)	N=6	121.7		None	PASS
Inguinal Hernia Repair	N=6	50.0		None	PASS

1) Each procedure was considered a failure if any single malfunction (if occurs) not resolved within 15 minutes of its occurrence in any one procedure. In the event that an Arm Cart Assembly malfunctions, it will be considered acceptable to convert to a 3-arm procedure so long as the procedure can be resumed within 15 minutes of the arm malfunctioning.
2) Three surgical teams per procedure were recruited. Each team performed the designated procedures for one or two samples.
3) Acceptable criteria for customer requirements include below: Image quality, Field of view, Acceptable patient positioning, Setup to achieve acceptable surgical workspace, Acceptable redocking efforts, Acceptable port locations, and Bedside access to patient

This trial will collect patient data undergoing two representative procedures in robotic surgery field. To be specific, indications under the study include one procedure each in the non-general surgery (GS) specialty (e.g., prostatectomy), and the GS specialty (e.g., cholecystectomy) were chosen for following reasons. First, robot-assisted prostatectomy is the first procedure performed in Korea as well as the most frequently performed robotic procedure in Korea [4]. The number of prostatectomy is expected to increase as increasing prevalence of prostate cancer in Korea.

Next, according to the Main Surgery Statistical Yearbook 2019 [5], cholecystectomy is the fifth most frequently performed surgery in Korea (84,500 cases as of 2019) so that there are many patients who can get therapeutic benefits through product approval. Furthermore, robotic cholecystectomy has gained popularity as a gateway procedure during the initial phase of robotic training [6], and the clinical effectiveness has been proven using commercialized products such as da Vinci and Revo-i.

This study will evaluate the safety and effectiveness of the Medtronic Hugo™ RAS System when used for representative procedures.

4.2. Objectives

This study aims to evaluate the safety and effectiveness of the Medtronic Hugo™ RAS System when used for prostatectomy or cholecystectomy.

4.2.1. Primary Objective

The primary objective is to confirm that the Medtronic Hugo™ RAS System performs as intended when used for prostatectomy or cholecystectomy. Primary endpoint is below:

- Completion rate: A proportion of subjects who completed the surgery without conversion (to open or conventional laparoscopic surgery) due to system serious malfunction, and without any major complications within 24-hour post-surgery
  * Major complication is defined as Clavien-Dindo grade ≥3

4.2.2. Secondary Objective

The secondary objective is to assess the short-term safety outcome of the Medtronic Hugo™ RAS System when used for prostatectomy or cholecystectomy. Secondary endpoints are below:

- Overall complication rate through 30-day post-surgery: A proportion of subjects with any post-operative complication within 30-days post-surgery using the investigational device
- Major complication rate through 30-day post-surgery: A proportion of subjects with any post-operative complication classified ≥3 by the Clavien-Dindo system within 30-days post-surgery using the investigational device

- Readmission rate through 30-day post-surgery: A proportion of subjects hospitalized within 30 days post-surgery
- Reoperation rate through 30-day post-surgery: A proportion of subjects go through reoperation for the same indication within 30 days post-surgery
- Device deficiency rate: A proportion of subjects with any device deficiency (DD) during robotic assisted surgery using the investigational device

5. Product Description

5.1. General

The Medtronic Hugo™ RAS System is a modular robotic platform for performing robotically assisted minimally invasive surgery. As per the Regulations for Product Classification of Medical Device and Class by Product (MFDS Notification No. 2021-83. Oct 28, 2021), it is a class III medical device (Robotic surgical system, navigation). It enables the surgeon, sitting at an ergonomically adjustable console, to view the surgical field in three dimensions (3D) and control movements of the endoscope and instruments with individual robotic arms at the operating table. The Medtronic Hugo™ RAS System platform supports a portfolio of wristed instruments. The main components of the Medtronic Hugo™ RAS System are described in the following subsections. Refer Appendix 14.4. Instructions for Use for details.

(Left to Right: System Tower, Surgeon Console, Arm Carts (4))

Figure 1. Hugo™ RAS System Overview

5.1.1. Hugo™ RAS Surgeon Console

The surgeon console is an open console that consists of a large flat screen with a high-definition 3D passive display, a small touchscreen interactive display, adjustable ergonomic controls, an armrest, two surgeon hand controllers, a set of foot pedals, and 3D surgeon and observer glasses. The surgeon hand controllers are easy to move and respond to wrist movement. Sensors in the surgeon console track the movement of the 3D glasses worn by the surgeon and can clutch movement of the instruments if the surgeon looks away from the 3D display.

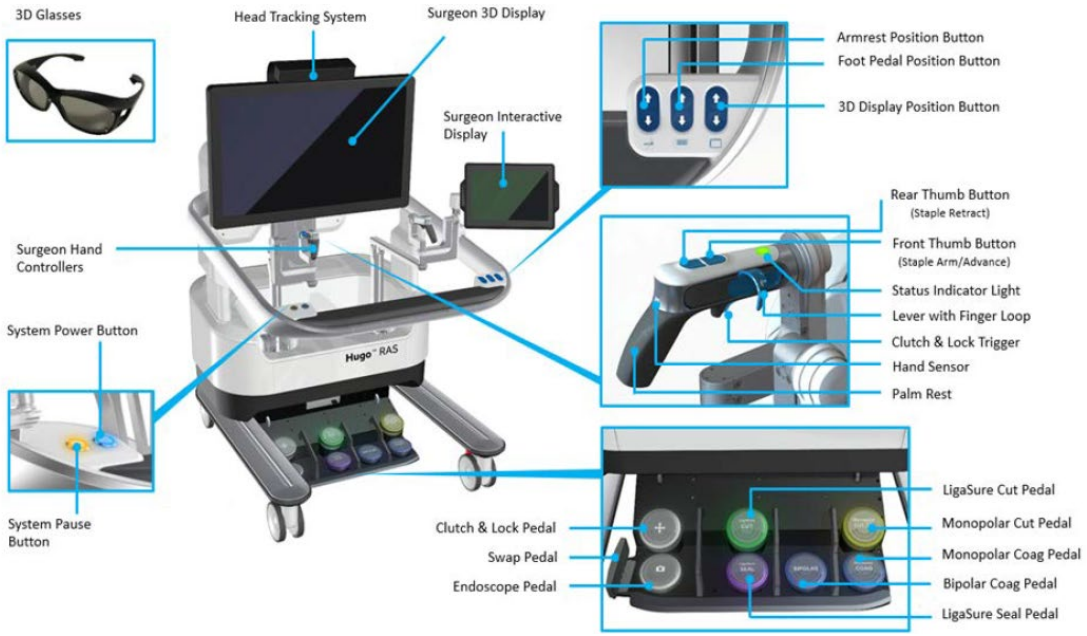


Figure 2. Surgeon Console

5.1.2. Hugo™ RAS Arm Cart Assembly

The arm carts consist of movable platforms with casters, each supporting a modular and extendable arm. Up to four arm carts can be connected to the system tower for simultaneous use during RAS. The arm carts are portable and easily movable within the operating room (OR) and the hospital. Prior to surgery, the OR team positions the arm carts around the surgical table according to the surgical procedure. The team can adjust the arm carts and arms to accommodate patient positioning and optimize bedside access to the patient.

Figure 3. Arm Carts

5.1.3. Hugo™ RAS Tower

The system tower houses computers, the endoscope system, the electrosurgical generator, the power management system with a backup battery, and the high-definition OR team touchscreen interactive display. The system tower allows the surgeon console to control the movements of up to four arms. It may also be used without the surgeon console to power up to four arms for standalone manual control at the bedside, or by itself for standard laparoscopic visualization and electrosurgery.

Figure 4. System Tower

5.1.4. Hugo™ RAS Endoscope Adapter

The Hugo™ RAS endoscope adapter is intended to hold the compatible Karl Storz TIPCAM®1 S 3D endoscope used with the Medtronic Hugo™ RAS System. The endoscope adapter will be attached to the robotic arm for the Medtronic Hugo™ RAS System during the surgical procedures.

5.1.5. Other Components

- The Hugo™ RAS sterile interface module: It is intended to be used with the Hugo™ RAS system as a universal connection on the robotic arm for the Hugo™ RAS sterile instruments and endoscope adapter during the representative surgical procedures set forth in the Hugo™ RAS system user guide.
- The Hugo™ RAS Arm Cart Sterile Drape: The Arm Cart Sterile Drape (single-use) covers the non-sterile robotic arm, or upper part of the arm cart, or lower part of the arm cart of the Hugo™ RAS System in order to allow the system to be used within the sterile field.

- The Hugo™ RAS system's wristed instruments: They are minimally invasive instruments that provide two degrees of freedom (pitch, yaw) at the distal end of the instrument. These degrees of freedom, when commanded from the surgeon console, allow for precise and dexterous control of the instrument by the surgeon.
- Software: Software versions will be captured in shipment records, including the clinical shipment/return form.

5.2. Manufacturer

Company Name	Address	Country
Plexus Corp	62400 Millbrook Dr. Buffalo Grove, IL 60089 USA	USA

5.3. Equipment

The necessary equipment to complete study procedure, includes but is not limited to (1) Investigational Device (Medtronic Hugo™ RAS System), (2) Medtronic Hugo™ RAS System-Compatible Components. The investigational device and the compatible components will be provided to the study site by the sponsor. The investigational device and compatible components are listed in Appendix 14.3.

5.4. Intended Use

The Hugo™ Robotically Assisted Surgery (RAS) System is intended to assist in the accurate control of instruments and accessories including rigid endoscopes, blunt and sharp endoscopic dissectors, scissors, forceps/graspers, needle holders, endoscopic retractors, electrosurgical tools and accessories for endoscopic manipulation of tissue, including grasping, cutting, blunt and sharp dissection, approximation, ligation, electrosurgery, and suturing during urologic and general endoscopic (laparoscopic) surgical procedures including prostatectomy and cholecystectomy.

The intended use is the same as that of locally commercialized devices. Table 3 compares the investigational device and commercialized devices in Korea.

Table 3. Comparison between the Investigational Device and Locally Marketed Device

Category	Investigational device	Locally marketed device (Revo-i)	Locally marketed device (da Vinci)
Intended population	Patients under general endoscopic (laparoscopic) surgery	Patients under general endoscopic (laparoscopic) surgery	Patients under general endoscopic (laparoscopic) surgery
Components	Master console (open type), slave robot, vision system	Master console (immersive type), slave robot, vision cart	Master console (immersive type), slave robot, vision system

Category	Investigational device	Locally marketed device (Revo-i)	Locally marketed device (da Vinci)
Robotic arms	4 robotic arms (1 camera, 3 working), with modularity	4 robotic arms (1 camera, 3 working), without modularity	4 robotic arms (1 camera, 3 working), without modularity
Robotic control	Finger grip type	Grip control	Finger grip type
Main instruments	Monopolar, bipolar, vessel sealer	Monopolar, bipolar	Monopolar, bipolar, harmonic, vessel sealer, endo-stapler

5.5. Intended Population

The study population will consist of patients 22 years of age or older indicated for a robotic assisted prostatectomy or cholecystectomy with Hugo™ RAS.

5.6. Product Use

The instructions for use are summarized below. For the full instructions on investigational device scope of use and handling, please refer to Appendix 14.4. Instructions for Use.

5.6.1. Operating Room Setup

- Selecting system components: Before preparing the operating room (OR) for surgery, the OR team will need to select which Hugo™ RAS System components to retrieve from central stores.
- Preparing the operating room: Position the system tower as close to the surgical table as possible. Prepare the surgical table and patient-positioning aids according to the surgical procedure and patient. Position the arm carts according to the surgeon's preference and the Setup Guide. Position the surgeon console to maximize operating room awareness for the surgeon while seated at the surgeon console.
- System connections: Carefully plug in power cords, data cables (e.g., Surgeon console data cable, Arm cart data cables), and any external video equipment needed. Connect a cable to the video output on the rear panel of the system tower.
- Starting up the system: The surgeon console power cord and three system tower power cords will each need to be plugged into a separate, dedicated electrical circuit in the operating room to prevent circuit overload. The system will start up once the tower power cords are plugged in or when pressing the blue power button.
- Electrosurgical generator setup: Ensure that the electrosurgical generator is powered on and connected to the system.
- Adjusting brightness and contrast on the OR team interactive display

5.6.2. Preparing for Surgery

- Confirming components from the system tower: Check the OR team interactive display and confirm that the arms and surgeon console needed for the surgical procedure are connected.
- Arm setup: Calibrate arms on the OR team interactive display then complete arm setup according to the Arm Setup Guide. The following steps appear in the Arm Setup Guide: Draping arm cart, attaching instrument interface, placing port in patient (refer to 5.6.3 port placement for detail), positioning arm cart at bedside, docking arm to port, and checking arm positioning.
- Endoscope setup: Place the endoscope in the endoscope adapter
- Performing minimally invasive surgery prior to RAS (as needed): Perform any non-robotic surgical procedures as needed prior to performing robotic-assisted surgery.
- Setting up the surgeon console and initial arm assignments: Complete ergonomic setup

5.6.3. Port Placement

Port placement is dependent on a variety of factors, including target anatomy, planned procedures, pathology, and the experience and preference of the surgeon.

- Hugo™ RAS-specific port placement: Place ports referring to the setup guide covering particular specialty or target anatomical region of the specific procedure. During port placement the port should be inserted so that the Fulcrum Point (indicated by a thick black band on the port) is in the patient body wall or directly between the ribs. When placing ports, apply the following principles:
  - 2cm distance (minimum) between robotic port and any bony prominences
  - 10-16cm distance between tip of endoscope robotic port and deepest (or furthest) target anatomy
  - Place robotic ports for left hand and right hand closer to the target anatomy than endoscope port
  - 8cm distance (minimum) between adjacent robotic ports
  - Place assist port at least 5cm distance (minimum) from adjacent robotic ports

5.6.4. Working with the Endoscope and Instruments at the Bedside

The endoscope can be used with the system in multiple ways and configurations. The endoscope can be used for non-robotically-assisted minimally invasive surgery, or attached to an arm for general visualization of regional anatomy, ensuring safe port placement and instrument insertion.

- Adjusting the angle and position of the arm: During the surgical procedure, the angle or the position of the arm may need to be adjusted, for example to aim the endoscope manually or to address a collision between arms.
- Attaching and inserting the endoscope: Attach the endoscope adapter to an arm and move the endoscope forward into the port. The endoscope should then be used for direct visualization of the robotic port while inserting instruments.

- Attaching and inserting instruments: Select the appropriate instrument for the surgical task and determine to which arm to attach the instrument. The surgeon may request instruments from the OR team during the surgical procedures.
- Withdrawing and removing an instrument or endoscope: After the surgical task, withdraw the instrument or endoscope from the port and the arm.
- Repositioning the patient and surgical table (as needed): The patient and/or surgical table may need to be repositioned during the surgical procedure. If necessary, withdraw all instruments from the ports and disconnect all arms from the ports before repositioning.

5.6.5. Post Surgery Disassembly, Procedures, and Cleaning

- Withdrawing instruments or endoscope: Once the surgical procedure is complete, withdraw and remove the instruments and the endoscope from the port and the arm.
- Moving the arm carts: Disconnect the arms from the ports and move the arm carts away from the surgical table. Remove the most accessible arm carts first to ensure a safe removal. After moving the arm carts to an open area, remove the drapes.
- Post-case instrument care: Once the instruments have been removed from the arms at the end of a procedure, disassemble them as necessary and prepare for reprocessing.
- Wiping down the system: Follow the facility's protocol regarding the cleaning of capital equipment.

5.6.6. Shutting Down and Moving Hugo™

- Placing the arms in the transport and storage configuration: Before shutting down and disconnecting the system, place the arms in the transport and storage configuration for safe movement in the hospital.
- Shutting down the system: Press the blue power button on the front panel of the system tower or the left side of the surgeon console arm rest. When transporting or storing the surgeon console, locate the red AC power switch on the rear panel of the surgeon console and switch it to the off (O) position.
- Disconnecting the system: Disconnect the system data cables from the rear panel of the system tower and coil the cables. Unplug the surgeon console power cord and the system tower power cords (when transporting only).
- Transporting the system: Move the arm carts, the system tower, and the surgeon console for storage.

5.7. Product Training Requirements

The Medtronic Hugo™ RAS System should only be used by surgeons and OR staff who have received specific product training provided by Medtronic in the use of this device. Surgeons and hospital staff performing study procedures will be required to demonstrate a minimum level of professional

competency and product training outlined below prior to performing study procedures. Training evidence shall be documented.

Technical training focus areas include:

- Hugo™ System Operation
- Hugo™ System Surgical Field Set-up
- Hugo™ System Console Skills
- Hugo™ System Clinical Application
- RAS Fundamental Surgical Task Skills

Table 4 describes product training requirements.

Table 4. Product Training Requirements

Role	Product Training
Operating surgeons	• Completed simulator exercises on the Medtronic Hugo™ RAS System • Didactic training on the capability and features of the Medtronic Hugo™ RAS System • Completed hands-on training course
OR staff	• Didactic training on the capability and features of the Medtronic Hugo™ RAS System • Completed hands-on training course

5.8. Packaging

The Medtronic Hugo™ RAS System components and instruments will be labelled as investigational according to the Medical Device Act Enforcement Regulation (Prime Minister Decree No. 1786, Feb 18, 2022), including followings:

1. Label of “Investigational Purpose”
2. Product name and model name
3. Lot number and date of manufacture (or expiration date, if indicated)
4. Method of storage
5. Name of manufacturer or importer (for subcontracted manufacturer or importer, the origin of manufacture and country name shall be included)
6. Label the device with “Not for use other than for clinical trial”

5.9. Product Receipt and Tracking

Medtronic Hugo™ RAS System and necessary equipment will be shipped to each site and tracked. The study site will review content of the shipping form and investigational device and sign upon receipt. The

use of the device for a procedure or disposition of the devices (e.g., if returned due to damage upon arrival) will be recorded on a site device accountability log to be maintained at the site.

Medtronic Hugo™ RAS System and necessary instruments will be provided to each site upon sponsor collection and approval of all required regulatory documents. Each Medtronic Device and Device Instrument will be traced with the serial or lot number.

In case of a cybersecurity incident of the investigational device, the study site shall contact emergency contact of Medtronic Korea Ltd. and wait for appropriate action. The study site must not use the investigational device until the incident has been resolved. The Hugo™ RAS System does not support hospital network or other Ethernet connectivity. DO NOT connect the system to a network or other devices via Ethernet, to avoid unintended system or network behavior.

5.10. Product Storage

Per regulation, investigational device shall be managed by the investigational device manager designated by the head of the study site. However, due to the nature of the investigational device in this study, it will be managed by the principal investigator and designated study staff.

Study devices should be kept in or otherwise contained where only qualified study personnel can access the device (i.e., locked or secured). This area/container should be kept at ambient temperatures without exposure to water with adequate provisions for maintaining ambient temperatures if a loss of power is experienced. If the devices are exposed to water or a drastic change in temperature, sites should contact the sponsor for possible replacement devices.

5.11. Product Accountability

Access should be limited to designated study staff only. A device accountability log will be maintained at the site and reconciled by the end of the study. It is the site's responsibility to document the receipt (which includes shipping/dispersal date, the quantity, model, lot, and serial numbers, and expiration date), disposition of the product (per subject use, including amount used, amount remaining, etc.), transfer (if applicable), and return of all unopened investigational medical devices at the end of the trial.

It is the responsibility of the site to return the Medtronic Hugo™ RAS System to Medtronic at the end of study, along with any unused or expired Medtronic instruments or other components. Sites should follow instructions and complete all appropriate forms provided by the sponsor for product return.

The sponsor shall also keep records to document the physical location of all investigational devices from shipment of investigational devices to the investigation sites until return or disposal. Medtronic will perform periodic reconciliation of the investigational device to ensure traceability through monitoring.

6. Selection of Subjects

6.1. Study Population

A minimum of 40 subjects will be enrolled at single site in Korea. The subjects must be acceptable candidates for a fully robotic assisted procedure with the Medtronic Hugo™ RAS System, as determined by the principal investigator.

6.2. Subject Enrollment

A subject is considered enrolled in the study when the consent process is signed and dated. Subject enrollment will be consecutive at the institution according to required procedure types and eligibility criteria.

6.3. Inclusion Criteria

1) Adult subjects (22 years old or greater) who are willing to participate and provide informed consent
2) Subjects indicated for a radical prostatectomy or a cholecystectomy
 - Prostatectomy: Male patients requiring radical prostatectomy for clinically localized prostate cancer
  * Clinically localized prostate cancer is defined as following: biopsy-proven prostate adenocarcinoma, clinical staged as T1-T2N0M0 upon standard imaging findings such as bone scan, MRI, or CT
 - Cholecystectomy: Patients requiring cholecystectomy for cholelithiasis, cholecystitis, or gallbladder polyps[1]
  * For gallbladder polyps, only followings will be considered: gallbladder polyps ≥10 mm, enlarging polyps, or symptomatic gallbladder polyps[2]

6.4. Exclusion Criteria

1) Patient with a considerable risk for laparoscopic surgery (e.g., severe cardiopulmonary diseases which contraindicated to general anesthesia, uncontrolled coagulopathy, etc.)
2) Patients requiring urgent surgery
3) Pregnant or lactating women
4) Patients with either of followings:

[1] Indications for laparoscopic cholecystectomy include followings: Symptomatic cholecystitis, acute cholecystitis, chronic cholecystitis, acalculous cholecystitis, gallstones ≥3 cm, nonfunctioning gallbladder, anomalous union of pancreaticobiliary duct, thickened gallbladder wall, calcified gallbladder or porcelain gallbladder, gallbladder polyps, gallbladder mass, typhoid carrier, and asymptomatic sickle cell anemia (Kim & Seo. Hepato-Biliary-Pancreatic Surgery (4th ed.). 2019)

[2] Practical Guidelines for Management of Gallbladder Polyps (Korean Association of Hepato-Biliary-Pancreatic Surgery, 2010)

- Prostatectomy: Metastatic prostate cancer or estimated life expectancy less than 10 years[3]
- Cholecystectomy: Severe liver cirrhosis (Child-Pugh class C) with portal hypertension, suspicion of gallbladder cancer[4]

5) Previous abdominal surgery (open or laparoscopic) within 2 years before enrollment
6) Concurrent participation in another clinical study that may confound study results
7) Patient has a condition that could compromise study compliance (e.g., mentally incompetent, alcohol or drug abuse) as determined by the investigator
8) Subjects who are considered unsuitable to conduct the trial as determined by the investigator

6.5. Sample Size Determination

To estimate the number of sample size, two things are taken into account: The number of subjects from previous studies, and the minimum number [8][5] to show whether the primary objective is met. We plan to include 40 patients for the study.

- Research hypotheses: The completion rate is greater than or equal to 95% (point estimate).

The completion is defined that surgery completion without conversion (to laparoscopic or open surgery) due to system serious malfunction, and without any major complications within 24-hour post-surgery. Therefore, when a subject who inevitably converted not due to the Hugo™ RAS system, it is not considered as a surgery failure as per the definition and the subject will be excluded from the primary endpoint analysis. Also, a complication within 24-hour post-surgery will not be considered as a surgery failure unless it falls under the definition of major complication.

According to previous literature on adverse events in robotic surgeries over 14 years using da Vinci, the average rates of device malfunctions and failure-related conversions was 3% (varied between 0.4% and 8.0%) and 0.9% (varied between 0.1% and 2.7%), respectively [9]. In Korea, the reported rate of system malfunctions and failures was less than 2% among over 10,000 da Vinci robotic procedure cases between 2005 to 2013. However, no cases of malfunction led to conversion to open or laparoscopic surgery [10].

[3] According to the Korean Clinical Practice Guideline for the Treatment of Prostate Cancer (The Korean Urological Oncology Society, 2020)[7], radical prostatectomy is an appropriate therapy for any patient with clinically localized prostate cancer that can be completely excised surgically, who has a life expectancy of ≥10 years, and who has no serious comorbid conditions that would contraindicate an elective operation.

[4] Relative contraindications for laparoscopic cholecystectomy include followings: Inability to tolerate general anesthesia due to cardiopulmonary diseases, hemodynamic instability, pregnancy (3rd trimester), malignant tumors, liver cirrhosis and portal hypertension, and intestinal adhesions (Kim & Seo. Hepato-Biliary-Pancreatic Surgery (4th ed.). 2019)

[5] N≥30 according to the central limit theorems

With regards to the previous studies, the completion rate of surgery–the primary endpoint of this study–is expected to be over 90%. The study will be considered successful when the point estimate of the completion rate is greater than or equal to 95%, which is when ≤2 patients (among 40) does not reach the surgery completion. The primary endpoint is evaluated within short period (i.e., 24-hour post surgery) period so the dropout rate is not considered. Note that it is not possible to assess the surgery completion per the study definition when a subject who inevitably converted not due to the Hugo™ RAS system. In such cases, new enrollment is allowed until the minimum sample size (i.e., 40) is reached.

In summary, the estimated sample size is adequate to demonstrate the safety and performance of the investigational device regarding following reasons: (1) the estimated sample size is higher than the number of patients from recent pivotal trial (which used the same primary endpoint) of the locally commercialized product (i.e., 32; 17 prostatectomy cases and 15 cholecystectomy cases) [11, 12], and (2) the investigational device is intended to be used for the same patient population of the commercialized product.

7. Study Method

7.1. Duration

The expected study duration is approximately 9 months after protocol approval

- IRB submission and site activation: 3 months
- Subject enrollment to follow-up completion: 3 months
- Statistical analysis and report writing: 3 months

7.2. Design

This study is a prospective, single-center, single-arm, pivotal trial in 40 patients undergoing prostatectomy (20) or cholecystectomy (20) using the Medtronic Hugo™ RAS System. Subjects will be followed for 30 days post procedure. As this study is a single-arm trial, no randomization or blinding will be applied.

7.3. Rationale

This trial will collect patient data undergoing two representative procedures (i.e., prostatectomy, cholecystectomy) in robotic surgery field to minimize potential confounding effect due to surgeon's proficiency or learning curve.

The study is designed as single-arm trial due to following logistics issues: Room to setup the investigational device, space for storage, and the number of commercialized products at the study site.

The primary endpoint of this study is the completion rate, which is defined as a proportion of subjects who completed the surgery without conversion due to system serious malfunction, and without any major complications within 24-hour post-surgery. Recent pivotal trial approved from the MFDS also utilized completion rate as the primary endpoint [11, 12].

8. Study Procedures

8.1. Schedule of Events

Data collection requirements are summarized in Table 5.

Table 5. Data Collection and Study Procedure Requirements at Subject Visits

Procedure/Assessments	Baseline	Surgery	Discharge	Follow-up[1)]		
	-28D~0D	0D	0D~Day of discharge	7D (±3D)[2)]	14D (±3D)[2)]	30D (±7D)
Informed consent	X					
Eligibility check	X					
Demographics	X					
Medical history	X					
Laboratory tests[3)]	X		X[4)]		X	X
Vital signs	X	X	X[4)]		X	X
Indication under study[5)]	X					
Procedure information[5)]		X				
Device deficiency		As they occur				
Pathological exam[6)]			X			
Post-operative imagings[7)]			X	X		
Medication[8)]	X	X	X	X	X	X
Adverse event[9)]	As they occur					
Protocol deviation	As they occur					
Readmission/Reoperation				As they occur		
Study Exit						X

1) If any unscheduled visit occurs other than planned follow-up visit, subject's data (e.g., adverse event, medication, etc.) can be collected if applicable.
2) Applicable for prostatectomy subjects only.
3) Laboratory tests include complete blood cell and serum chemistry.
4) Timing of laboratory tests and vital sign assessments up to discharge will be immediately after surgery (Day 0; laboratory tests only), Day 1, and Day 3 for prostatectomy subjects, and Day 1 for cholecystectomy subjects.
5) Procedure-specific information will be collected each for prostatectomy or cholecystectomy.
6) Applicable for prostatectomy subjects only.
7) Applicable for prostatectomy subjects only. Post-operative imaging includes chest X-ray (AP view), abdomen X-ray (Supine or erect view), KUB X-ray, and cystography. The cystography will be conducted on Day 7, while other radiographs will be obtained on immediately after surgery (Day 0; except KUB X-ray), Day 1, and Day 3. Post-operative imaging findings will be only collected to in the CRF if it is related to adverse events.
8) Following study-related medications will be collected: Pre-procedure anticoagulants or monoamine oxidase inhibitors (which may affect hemostasis) within 30 days prior to surgery, any relevant medication related to the

study indication, pain medications due to an adverse event, medications given as treatment for an adverse event. Medication will be coded using WHO Drug Dictionary.
9) Adverse events will be collected after subject has agreed to participate and provided the written informed consent.

The study visits include baseline visit, admission (surgery to discharge), and follow-up visit after discharge:

- Baseline: To determine study eligibility and collect baseline information (demographics, medications, medical history, surgical history, etc.)
- Surgical procedure: To re-confirm eligibility criteria, procedure set-up and take-down, medication changes, intraoperative complication evaluation, disease state evaluation, procedure success, conversion rates, protocol deviation, adverse event evaluation, and device deficiency collection
- Up to hospital discharge: Adverse event evaluation, complication rate, disease state evaluation, medication changes and protocol deviation
- Follow-up after discharge: Adverse event evaluation, complication rate, disease state evaluation, length of hospital stay, readmission (if applicable), reoperation (if applicable), medication changes, protocol deviation and study exit

8.2. Subject Consent

Prior to initiation of any study-specific procedures, informed consent (IC) must be obtained from the subject. The informed consent form (ICF) must be personally signed and dated by the subject themselves and the principal investigator or a delegated investigator (physicians only) at the time of consent. The subject has the right to refuse and the refusal will not affect the routine care of the subject.

A subject may only consent after information has been given and explained to the subject on all aspects of the clinical investigation that are relevant to the subject's decision to participate. The subject must have ample time and opportunity to read and understand the ICF, to inquire about details of the study, and to decide whether or not to participate in the study. All questions about the study should be answered to the satisfaction of the subject. When required per regulation, the subject will be required to sign additional forms such as Personal Information Collection and Use Agreement, etc.

In the event the subject or legally designated representative cannot read and/or write, witnessed (impartial witness) IC will be allowed, provided detailed documentation of the process is recorded in the subject's case history and the witness signs and dates the IC. The IC and any other information must be read aloud to the prospective subject or his/her legally designated representative. Whenever possible, either the subject or his/her legally designated representative shall sign and personally date the informed consent form. The witness signs and personally dates the IC attesting that the information was accurately explained and that informed consent was freely given.

The IC process must be conducted by the principal investigator or an authorized designee. The process of IC must be conducted without using coercion or undue improper influence on or inducement of the subject to participate by the investigator or other study site personnel. The IC process shall not waive or appear to waive subject's legal right. The language used shall be as non-technical as possible and must be understandable to the subject.

Subjects will be informed that despite signing IC, the screening assessment may demonstrate the subject is not a suitable candidate for the study or the procedure and may be withdrawn. Subjects will also be informed that after the investigation visits are completed, the subjects will receive the standard medical care, just as they would have had they not participated in the study.

Prior to enrolling subjects, the site IC must be approved by the IRB. The document(s) must be controlled (i.e., versioned and/or dated) to ensure it is clear which version(s) were approved by the IRB. Any adaptation of the sample IC must be reviewed and approved by Medtronic and the IRB reviewing the application prior to enrolling subjects.

A copy of the IC signed and dated as required by law, must be provided to the subject. The original of the signed ICF (and any other privacy language if required) must be filed with the subject's study documents and made available for review by sponsor site monitors, auditors, or regulatory inspectors.

It is best practice for the IC process to be documented in the subject's case history, regardless of circumstance. If the IC is obtained the same day the subject begins participating in study-related procedures, it must be documented in the subject's case history that consent was obtained prior to participation in any study-related procedures.

The investigator must notify the subject of any significant new findings about the study that become available during the course of the study which are pertinent to the safety and well-being of the subject, as this could impact a subject's willingness to participate in the study. If relevant, consent may be requested from subjects to confirm their continued participation.

8.3. Enrollment

A subject is considered enrolled when the consent is provided. The date the subject signed the IC must be documented in the subject's medical records. Enrollment can be a stand-alone visit or can occur on the same day as the baseline visit. Once consent is obtained, a subject identification number will be assigned and data collection on adverse events (AEs), study deviations and subject exits will occur.

8.4. Baseline (Day -28 to 0)

When a subject is consented, the principal investigator will review the subject's medical record and confirms if they meet all specified inclusion criteria and none of the exclusion criteria. The baseline visit

can be a stand-alone visit or can be performed on the same day prior to the surgical procedure. The following information is required to be collected at the baseline visit:

- Enrollment status: Date of consent, eligibility check
- Demographics: Sex (male/female), date of birth, height (cm), weight (kg), body mass index (BMI)
- Medical history: Comorbidities or past surgical history (within the last year), family history of study indication (i.e., prostate cancer, cholelithiasis, cholecystitis, or gallbladder polyps), ASA class [13]
- Laboratory tests: Complete blood cell, serum chemistry (e.g., Complete blood cell (RBC, WBC, Hb, Hct, Platelet, ESR, etc.), admission panel (Glucose, Calcium, Phosphorous, BUN, Uric acid, Creatinine, eGFR (MDRD), AST, ALT, ALP, Total bilirubin, Albumin, Total protein, etc.), electrolyte panel (Sodium, Potassium, Chloride, etc.), hs-CRP
- Vital signs: pulse rate (bpm), respiration rate (bpm), blood pressure (mmHg), body temperature (°C)
- Indication under study: Date of diagnosis (i.e., prostate cancer, cholelithiasis, cholecystitis, or gallbladder polyps), and following items (collected per indication)
  - Prostatectomy: Prostate volume (g), Biopsy Gleason score [14], PSA (ng/mL), clinical stage per AJCC rules [15], prior neoadjuvant hormonal therapy
  - Cholecystectomy: Concomitant bile duct stones, ERCP
- Prior medications: Brand name, indication (see Section 8.9 for details)
- Adverse event (if any): Diagnosis, seriousness, severity, action taken, outcome, relatedness, etc.

8.5. Surgical Procedure (Day 0)

The subject will arrive for admission to the hospital and prepped for surgery. On the day of surgery, the subject will receive a robotic assisted prostatectomy or cholecystectomy per indication. Pre-operative and operative procedures are according to local standard practices. The following information is required to be collected at the surgery visit:

- Pre-operative vital signs: pulse rate (bpm), respiration rate (bpm), blood pressure (mmHg), body temperature (°C)
- Procedure information
  - Date of admission, date of surgery

- Operative time: Setup time[6], console time, total operative time (skin to skin time), takedown time
- Estimated blood loss (mL)
- Conversion: Conversion to open/laparoscopic surgery during procedure (and reason for conversion, if conversion occurs)
- Blood transfusion: Blood transfusion during surgery (and the number of blood pack used if transfusion required)
- Changes to port placement (and reason for change, if occurs)
- Delay in robot setup time or total operative time (and reason for delay, if occurs)
- Device information: Lot number, software version, compatible instruments
- Other measurements: Collected per indication
  - Prostatectomy: Pelvic lymph node dissection, nerve-sparing prostatectomy
  - Cholecystectomy: Amount of gallbladder adhesions, concomitant gallbladder stones, type of gallbladder polyps (if applicable), acute cholecystitis, other concomitant procedures, use of drainage tube

- Medication: Brand name, indication (see Section 8.9 for details)
- Adverse event (if any): Diagnosis, seriousness, severity, Clavien-Dindo grade, action taken, outcome, relatedness, etc.
- Device deficiency (if any): Diagnosis, applicable device information (e.g., device type, Lot number, etc.)

In addition to above, below information is to be collected immediately after prostatectomy.

- Laboratory tests: Complete blood cell, serum chemistry (e.g., Complete blood cell (RBC, WBC, Hb, Hct, Platelet, ESR, etc.), admission panel (Glucose, Calcium, Phosphorous, BUN, Uric acid, Creatinine, eGFR (MDRD), AST, ALT, ALP, Total bilirubin, Albumin, Total protein, etc.), electrolyte panel (Sodium, Potassium, Chloride, etc.),
- Post-operative imaging (only collected if it is related to adverse events): Chest X-ray (Chest AP) findings, abdomen supine X-ray findings

The detailed procedural steps are described below[7]. The steps can vary based on surgeon's technique, preference, and patient's condition.

[6] Setup time is defined as sum of following durations: Time from the first robot arm plugged in to all arms fully calibrated, time spent to drape all robotic arms, and time from the movement of the first arm to the patient to all arms docked to ports.

[7] See Hugo Set-up Guide and Hugo User Guide for detailed information

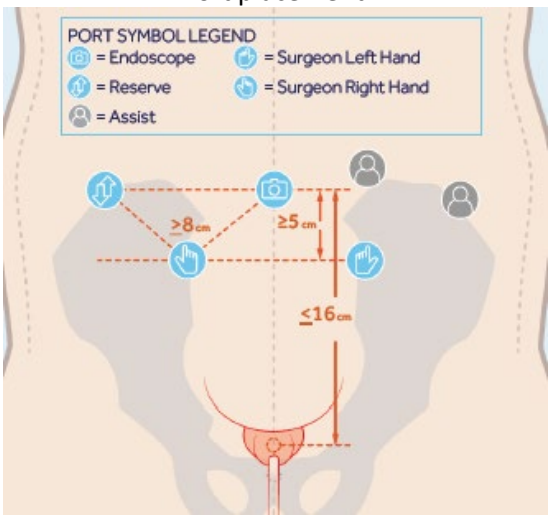
8.5.1. Prostatectomy Procedures

The key steps in robotic radical prostatectomy are below:

- Patient positioning: The patient is prepped and draped in lithotomy and Steep Trendelenburg (>20°) position under general anesthesia.
- Port placement: Incisions for port placement are made. The camera port is placed through a periumbilical incision. Three remaining ports (i.e., left, right, and reserve) are placed at a safe distance from the camera port and/or adjacent ports. If necessary, non-robotic assist ports can be placed at a safe distance from adjacent robotic ports.
- Arm cart positioning: The robotic arms are connected to the robotic ports. The endoscope and wristed instruments are attached to robotic arms and inserted to ports.
- Dropping the bladder: The bladder is separated from the peritoneum down to the vas deferens and then deep into perirectal space. The anterior prostatic fat is dissected and further dissected off of the anterior prostatic capsule from the apex to the bladder neck.
- Endopelvic fascia: The endopelvic fascia is initially incised laterally closer to muscle than the nerve. At the apex, completely release Myer's muscle to visualize and protect the apex, neurovascular bundle (NVB), and urethra when transecting the dorsal venous complex (DVC) and remaining apical structures.
- Anterior or posterior bladder neck: The site of transection of the anterior bladder neck is visually facilitated by retracting the Foley balloon. Transection of the bladder from the prostate.
- Seminal vesicles and rectum: The seminal vesicles are used to lift the prostate for separation from the rectum. Denonvilliers' fascia is grasped and lifted and incised sharply until the perirectal fat is seen.
- Transection of the prostatic pedicles and the NVBs: Nerve preservation with athermal coldcut resection sharply releasing the nerve from the prostate without traction.
- DVC and urethral transection: The dorsal vein and urethra are cut then oversew the DVC.
- Vesicoureteral anastomosis: Circular anastomosis between urethra and bladder.
- Specimen removal and closure: The resected prostate gland and attached seminal vesicles are removed and the incised port site is closed..
- Arm cart undocking: The arms are disconnected from the ports. The patient is moved off the table and taken to the recovery room.

Figure 5 describes port placement and arm cart positioning during the robotic prostatectomy. Deviations may need to be made for specific patient body habitus, patient pathology, or surgeon preference.

Port placement



Arm cart positioning

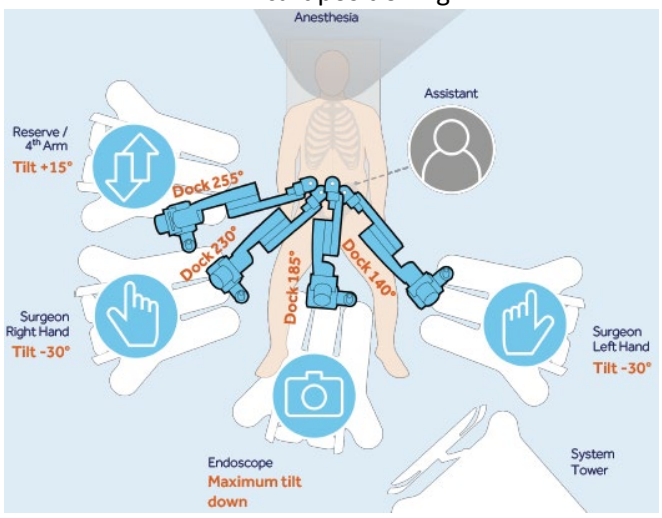


Figure 5. Port Placement and Arm Cart Positioning (Prostatectomy)

8.5.2. Cholecystectomy Procedures

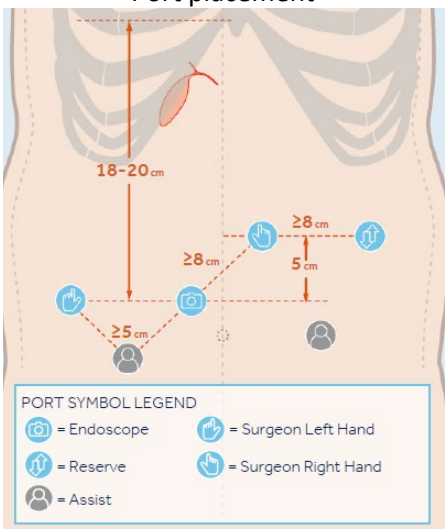
The key steps in robotic cholecystectomy are below:

- Patient positioning: The patient is prepped and draped in reverse Trendelenburg (>20°) position under general anesthesia.
- Port placement: Incisions for port placement are made. The camera port is placed through a periumbilical incision. Three remaining ports (i.e., left, right, and reserve) are placed at a safe distance from the camera port and/or adjacent ports. If necessary, non-robotic assist ports can be placed at a safe distance from adjacent robotic ports.
- Arm cart positioning: The robotic arms are connected to the robotic ports. The endoscope and wristed instruments are attached to robotic arms and inserted to ports.
- Identification of gallbladder after insertion of endoscope: After identification of the gallbladder, the fundus is retracted cephalad over the liver with a grasping instrument.
- Dissection of cystic pedicle: Adhesions are taken down using the Maryland dissector. Using an additional grasper, the gallbladder is retracted inferolaterally to expose the triangle of Calot.
- Separation of cystic artery from cystic duct: The separation of the cystic duct anteriorly from the cystic artery behind and can be performed by a Maryland grasper.
- Clipping of cystic artery: The cystic artery is clipped and then divided by hook scissors and the dissection of the cystic pedicle is completed by placement of a clip to occlude the cystic duct.

- Dissection of gallbladder from liver bed: Gallbladder should be separated from the liver performed with scissors with electrosurgical attachment or Monopolar hook or knife.
- Extraction of gallbladder and closure: After completion of the gallbladder resection, it will be placed in a retrieval bag and removed through the umbilical port. All incised port site is closed.
- Arm cart undocking: The arms are disconnected from the ports. The patient is moved off the table and taken to the recovery room.

Figure 6 describes port placement and arm cart positioning during the robotic cholecystectomy. Deviations may need to be made for specific patient body habitus, patient pathology, or surgeon preference.

Port placement



Arm cart positioning

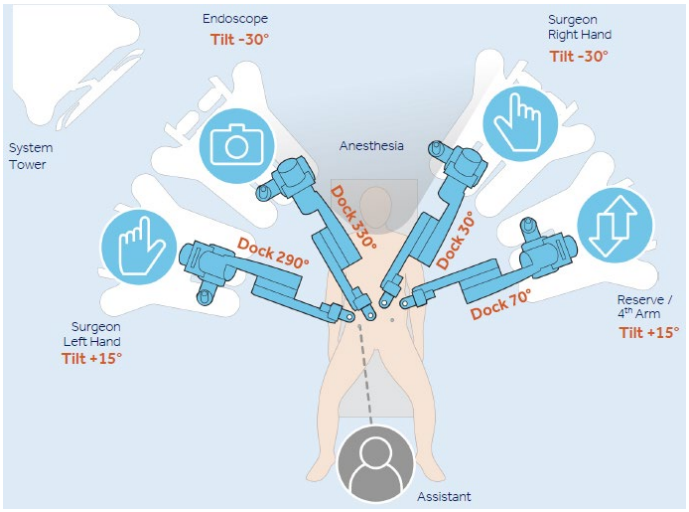


Figure 6. Port Placement and Arm Cart Positioning (Cholecystectomy)

8.6. Up to Hospital Discharge (After Surgery~Discharge)

The subject's condition will be closely monitored until discharge. Vital signs and laboratory test will be conducted on Day 1, 3 for prostatectomy subjects, and Day 1 for cholecystectomy subjects. AE will be collected and assessed according to Clavien-Dindo classification system. The following information is required to be collected:

- Date of discharge
- Laboratory tests: Complete blood cell, serum chemistry (e.g., Complete blood cell (RBC, WBC, Hb, Hct, Platelet, ESR, etc.), admission panel (Glucose, Calcium, Phosphorous, BUN, Uric acid, Creatinine, eGFR (MDRD), AST, ALT, ALP, Total bilirubin, Albumin, Total protein, etc.), electrolyte panel (Sodium, Potassium, Chloride, etc.), hs-CRP)

- Vital signs: pulse rate (bpm), respiration rate (bpm), blood pressure (mmHg), body temperature (°C)
- Medication: Brand name, indication (see Section 8.9 for details)
- Adverse event (if any): Diagnosis, seriousness, severity, Clavien-Dindo grade, action taken, outcome, relatedness, etc.
- Other measurements: Collected per indication
  - Prostatectomy: Date of urinary catheter removal
  - Cholecystectomy: Date of drain removal

In addition to above, below information is to be collected for prostatectomy subjects. Post-operative imaging will be conducted on Day 1 and 3, but findings will be only collected if it is related to adverse events.

- Pathological exam: Pathological stage per AJCC rules, tumor size (mm), positive surgical margin (and its location, if positive)
- Post-operative imaging (only collected if it is related to adverse events): Chest X-ray (Chest AP) findings, abdomen erect X-ray findings, KUB X-ray findings

8.7. Post-Operative Follow-up (Up to Day 30)

Subject will be followed through 30-day post-surgery.

8.7.1. Prostatectomy Subjects (Day 7, Day 14, and Day 30)

Prostatectomy subjects will be followed at 7-day (±3 days), 14-day (±3 days), and 30-day (±7 days) post-operative outpatient visits. The following information will be collected:

NOTE: Laboratory tests and vital sign assessments will be done at Day 14 and 30 only, and cystography will be done on Day 7 only.

- Laboratory tests (Day 14, Day 30 only): Complete blood cell, serum chemistry (e.g., Complete blood cell (RBC, WBC, Hb, Hct, Platelet, ESR, etc.), admission panel (Glucose, Calcium, Phosphorous, BUN, Uric acid, Creatinine, eGFR (MDRD), AST, ALT, ALP, Total bilirubin, Albumin, Total protein, etc.), electrolyte panel (Sodium, Potassium, Chloride, etc.), hs-CRP), PSA (ng/mL) (Day 30 only)
- Vital signs: pulse rate (bpm), respiration rate (bpm), blood pressure (mmHg), body temperature (°C)
- Post-operative imaging (only collected if it is related to adverse events): Cystography findings (Day 7 only)
- Medication: Brand name, indication (see Section 8.9 for details)
- Adverse event (if any): Diagnosis, seriousness, severity, Clavien-Dindo grade, action taken, outcome, relatedness, readmission/reoperation (and surgeon comments on the AE form if occurs), etc.

8.7.2. Cholecystectomy Subjects (Day 30)

Cholecystectomy subjects will be followed at 30-day (±7 days) post-operative outpatient visit. The following information will be collected:

- Laboratory tests: Complete blood cell, serum chemistry (e.g., Complete blood cell (RBC, WBC, Hb, Hct, Platelet, ESR, etc.), admission panel (Glucose, Calcium, Phosphorous, BUN, Uric acid, Creatinine, eGFR (MDRD), AST, ALT, ALP, Total bilirubin, Albumin, Total protein, etc.), electrolyte panel (Sodium, Potassium, Chloride, etc.), hs-CRP)
- Vital signs: pulse rate (bpm), respiration rate (bpm), blood pressure (mmHg), body temperature (°C)
- Medication: Brand name, indication (see Section 8.9 for details)
- Adverse event (if any): Diagnosis, seriousness, severity, Clavien-Dindo grade, action taken, outcome, relatedness, readmission/reoperation (and surgeon comments on the AE form if occurs), etc.

8.8. Subject Exit, Withdrawal or Discontinuation

Subjects have the right to refuse to participate the study as well as voluntarily withdraw from the study at any time. In case of study exit, the reason and date for study exit of all enrolled subjects will be documented on the applicable page of case report form (CRF). Subjects may be exited from the study for any of the following situations:

- Study completed (i.e., completed 30-day post-operative visit)
- Subject did not provide consent
- Subject chooses to withdraw
- Subject did not meet inclusion/exclusion criteria
- Subject did not receive surgery using the investigational device
- Subject death
- Subject lost to follow-up (i.e., up to 30-day post-operative visit)
- Unacceptable AEs
- Investigator deems withdrawal necessary (e.g., medically justified, failure of subject to maintain adequate study compliance)

All AEs must be followed until the AE has been resolved, is unresolved with no further actions planned, the subject dies or exits the study, whichever occurs first. In cases of early study exits, all data collected from the time of consent to the time of exit may be used. For subjects who complete the 30-day follow-up visit, the 30-day follow-up visit and exit visit should be combined, and CRF for both need to be completed.

8.9. Prior and Concomitant Medications/Therapies

There is no prohibited medication during the study, and the investigator shall follow institutional standard of care to manage medications. Follow the guidelines below to report medications relevant to this study:

- Report applicable pre-procedure medications if taken within 30 days of the study procedure as listed Table 6
- Any relevant medication related to the study indication
- Pain medication(s) must be reported if given when pain (Clavien Dindo Grade 1 or higher – pain exceeds that which is considered within normal limits) is reported as an AE
- Medications given as treatment for an AE should be captured

Table 6. Medications Taken within 30 Days prior to Surgery

Anticoagulants taken within 30 days prior to surgery	Monoamine Oxidase Inhibitors (MAOIs) taken within 30 days prior to surgery
• Warfarin (Coumadin) • Enoxaparin (Lovenox) • Clopidogrel (Plavix) • Ticlopidine (Ticlid) • Aspirin (in many versions) • Non-steroidal anti-inflammatory (NSAIDS) (in many versions) • Dipyridamole (Persantine) • Vitamin E • Garlic • Ginger • Ginkgo biloba and other anticoagulants not mentioned above	• Tranylcypromine (Parnate, Sicoton) • Phenelzine (Nardil, Nardelzine) • Isocarbonazid (Marplan) • Rasagiline (Azilect) • Selegiline (Eldepryl, Deprenyl) • Linezolid (Zuvox) (an antibiotic) • St. John's Wort and other MAOIs not mentioned above

Exclude the reporting of antiemetics, antipyretics, analgesics, diuretics, electrolytes, antibiotics, digestives, antitussives, expectorants, physiotherapy and so forth when given per standard of care procedures and/or within normal limits (dosage and frequency).

All collected medications will be coded using WHO Drug Dictionary.

8.10. Assessment of Effectiveness

Effectiveness of the Hugo™ RAS System will be evaluated through the study primary endpoint (completion rate). Effectiveness assessment will be done on the day of surgery as below.

- Completion rate: A proportion of subjects who completed the surgery without conversion due to system serious malfunction, and without any major complications within 24-hour post-surgery

Surgery completion is defined if procedure is completed without conversion to open or laparoscopic surgery due to system serious malfunction per surgery record, and no major complication reported within 24-hour post-surgery period. Note that unavoidable Aes are inherent to the procedure (see Section 10.2 for details) are not included in this definition of major complication within 24-hour post-surgery.

8.11. Assessment of Safety

Safety will be assessed by monitoring the occurrence of Aes and DDs. AE assessments will take place starting with the point of consent through study exit and will be recorded in the CRF. The secondary endpoints of this study (i.e., complication rate and readmission/reoperation rate (through 30-day post-surgery), DD rate) will assess the safety of the investigational device. See Section 10 for further information on the collection of safety information.

8.12. Recording Data

Data collected on each subject will be recorded on a web-based electronic case report form (eCRF). The electronic data capture system maintains an audit trail on entries, changes or corrections in the CRFs. Instructions for proper completion of the CRF will be provided to the site at the start of the study. The investigator must ensure accuracy, completeness and timeliness of the data in the CRFs. CRFs shall be signed by the principal investigator or a delegated investigator (physicians only).

Data entered must be traceable to source documents. The investigator must ensure the availability of source documents from which the information on the eCRFs was derived. Source documents, which may include subject medical records, clinical charts, procedure reports, and laboratory notes, must be created and maintained by the investigational study site team. The type and location of source documents should be documented. Where printouts of electronic medical records, are provided as source documents, or where copies of source documents are retained as source documents, those should be certified. Certification must contain (1) the signature of the individual making the copy, (2) the date the copy was made and (3) a statement attesting to the accuracy and completeness of the copy.

In general, eCRFs (or paper copies) may not serve as source documents. For data elements not routinely captured in medical records, the study site may use source document worksheets if identified as source documents. On the other hand, the CRF may be considered source for the following data collection elements:

- Enrollment status: Study site assigned subject reference, study exit, reason for exit
- Adverse event: Date study site became aware of event, severity, Clavien-Dindo grade, relatedness
- Device deficiency: Date study site became aware of event
- Study deviations: Reason for deviation

The source documents must be made available for monitoring or auditing by Medtronic's representative or representatives of the competent authorities and other applicable regulatory agencies.

8.13. Deviation Handling

A study deviation is defined as an event within a study that did not occur according to the Clinical Investigation Plan (CIP) or the Clinical Trial Agreement (CTA). Prior approval by the sponsor of deviation is expected unless when a deviation is necessary to protect the safety, rights or well-being of a subject in an emergency or in unforeseen situations beyond the investigator's control (e.g., subject failure to attend scheduled follow-up visit, inadvertent loss of data due to computer malfunction, inability to perform required procedures due to subject illness). All study deviations must be reported on the CRF regardless of whether medically justifiable, preapproved by the sponsor, an inadvertent occurrence, or taken to protect the subject in an emergency.

In the event the deviation involves a failure to obtain a subject's consent, or is made to protect the life or physical well-being of a subject in an emergency, the deviation must be reported to the IRB as well as sponsor within five working days. All other study deviations must be reported to the sponsor as soon as possible upon the study site becoming aware of the deviation, per IRB policies and/or local laws.

The sponsor is responsible for analyzing deviations, assessing their significance, and identifying any additional corrective and/or preventive actions (e.g., amend the CIP, conduct additional training, terminate the investigation). Repetitive or serious investigator compliance issues may result in initiation of a corrective action plan with the investigator and study site, and in some cases, may necessitate suspending enrollment until the problem is resolved or ultimately terminating the investigator's participation in the study.

Examples of major study deviations include but are not limited to:

- Failure to obtain proper IC
- Subject did not meet Inclusion/exclusion criteria
- Failure to collect required study data up to 30-day post-surgery

Other minor deviations shall be recorded along with reason for deviation. Subjects with minor deviation only may not be excluded from the final analysis unless the deviation affects the study outcome.

9. Statistical Design and Methods

9.1. General Aspects of Analysis

The study analysis will occur after all patients complete the 30-day follow-up and data entry error or non-reasonable values are cleaned. Data analysis will be performed by Medtronic or its designee using SAS for Windows (version 9.4 or higher, SAS Institute Inc. Cary, NC) or other widely accepted statistical or graphical software.

Statistical tests will be conducted at a two-sided alpha level of 0.05. Confidence intervals will be presented as 95% confidence intervals.

The following populations will be considered for the analysis of data for this study:

- Full Analysis Set (FAS): The full analysis set is defined as all enrolled subjects in whom the Hugo™ RAS procedure is begun (defined as the first skin incision). In the event that a subject is consented but the first incision does not occur (e.g., if the subject becomes ineligible during the timeframe between consent and the procedure day), that subject will be excluded. Also, a subject who inevitably converted (to open or conventional laparoscopic surgery) not due to the Hugo™ RAS system will be included in the safety and other descriptive analyses but excluded from the primary endpoint analysis (since the subject is not evaluable).
- Per Protocol Set (PPS): The per protocol set is a subset of the FAS including only those without any major protocol deviations. Following subjects from the FAS will be excluded from the PPS:
  - Subject who inevitably converted (to open or conventional laparoscopic surgery) not due to the Hugo™ RAS system
  - Subject did not meet Inclusion/exclusion criteria
  - Subject chooses to withdraw
  - Failure to collect required study data up to 30-day post-surgery

The FAS will be the primary analysis set for the evaluation of the primary and secondary endpoints. Statistical analysis will be performed for each analysis set. However, if all subjects complete the study per the CIP, the results can be presented regardless of the analysis set.

Subject disposition will be illustrated in a CONSORT diagram. All enrolled subjects will be included in a subject disposition table indicating reasons for exclusion from the FAS and PPS analysis sets.

Descriptive statistics will be used to present the data and to summarize the results. Continuous variables will be summarized with number of subjects (n), mean, standard deviation, median, and ranges. Categorical variables will be summarized by frequencies and percentages. The 95% confidence intervals for means and/or percentages will be also presented.

The study will be considered successful when the primary endpoint is met: if the point estimate of the completion rate is greater than or equal to the pre-determined value (i.e., 0.95) in the FAS.

Missing data will not be imputed for the primary analysis, and multiple testing adjustments are not considered. Sensitivity analysis (e.g., multiple imputations for missing data) may be performed to ensure the study results are robust.

9.2. Pre-operative Characteristics

Descriptive statistics will be used to summarize pre-operative characteristics of subjects per indication, including: demographics, medical history, vital signs, laboratory test results, ASA class, etc.

9.3. Surgical Data

Descriptive statistics will be used to summarize procedure information, including but not limited to: setup time, console time, total operative time, takedown time, estimated blood loss, conversion to open/laparoscopic surgery, blood transfusion during the surgery, length of hospital stay, delay in robot setup time, and delay in total operative time.

9.4. Primary Endpoint

The Clopper-Pearson Exact test for single proportion will be conducted. The number of subjects successfully completed the surgical procedure, percentage, and its 95% confidence interval will be summarized. If the point estimate of the completion rate is greater than or equal to the pre-determined value (i.e., 0.95), it is considered that the primary objective is met.

9.5. Secondary Endpoints

Descriptive statistics will be used. Frequency, percentage, and its 95% confidence interval will be presented for each secondary endpoint: overall complication rate through 30-day post-surgery, major complication rate through 30-day post-surgery, readmission rate through 30-day post-surgery, reoperation through 30-day post-surgery, and DD rate. The Clopper-Pearson Exact test with 95% confidence interval for single proportion will be conducted.

Any post-operative complication or major complication will be summarized by MedDRA term (system organ class and preferred term), along with the number of events and the number of subjects with an event. Regarding DD, the number of DDs and the number of subjects with a DD shall be presented.

9.6. Other Pre-Specified Measures

Descriptive analyses of other pre-specified measures beyond the primary and secondary objectives will be performed for followings: AE rate, pathological findings (only for prostatectomy subjects).

AEs during the study period will be summarized by MedDRA term (system organ class and preferred term), along with the number of events and the number of subjects with an event.

9.7. Interim Analysis

No interim analyses are planned for this study.

9.8. Subgroup Analyses

Subgroup analyses may be used to explore the safety and performance of the study device given various patient, medical, and procedural factors. Subgroup factors include below but not limited to:

- Sex (Male vs. Female) (Cholecystectomy only)
- Age group
- ASA class
- Obesity (BMI <25 kg/m^2 vs. BMI ≥25 and <30 kg/m^2 vs. BMI ≥30 kg/m^2)
- Comorbidities (Yes vs. No)
- Procedure-specific characteristics (e.g., nerve-sparing in prostatectomy)

10. Adverse Events and Device Deficiencies

10.1. Adverse Events and Device Deficiencies

All AEs will be collected throughout a subject's participation, starting from the time the IC is provided, regardless of their severity or relationship to the Hugo™ RAS or study procedures. Assessment of the occurrence of an AE will be based on changes in the subject's physical examination, laboratory results, and/or signs and symptoms. Reporting of these events to the sponsor will occur on an AE CRF, including date of AE, event description, treatment, resolution, assessment of both the seriousness of the AE and the relatedness to the system components. The completed AE CRF must be submitted to Medtronic as soon as possible.

In addition, DD information will be collected throughout the study and reported to the sponsor on a DD CRF. Note that DDs that result in an AE to the subject should be captured as an AE only. DD that could have led to a serious adverse device effect (SADE) (i.e., if suitable action had not been taken, if intervention had not been made, or if the circumstances had been less fortunate) require immediate reporting.

Upon receipt of AE or DD at Medtronic, a sponsor representative will review the AE/DD for completeness and accuracy and when necessary will request clarification and/or additional information from the investigator. If the event is unanticipated or unanticipated serious ADE, the sponsor will review the specific details behind those observations and determine what, if any, action is appropriate.

For any changes in status of a previously reported AE or DD (i.e., change in actions taken, change in outcome, change in relatedness), information needs to be updated on, or added to the original AE or DD CRF.

All AEs must be followed until the AE has been resolved, is unresolved with no further actions planned, the subject dies or exits the study, whichever occurs first. At the time of study exit, all collected AEs that are unresolved must be reviewed and an update to the original AE must be reported.

Adverse events that have not resolved at the time of the subject's discontinuation or completion of the study should have an outcome of Not Recovered/Not Resolved at study end in subject source and on eCRF. The investigator should ensure that subject is aware of any follow-up or additional treatment that is required for any ongoing AE at the end of study participation; however, there will be no eCRF entry for the ongoing follow-up.

10.2. Definitions/Classifications

This study will use AE definitions according to KGCP and/or ISO 14155:2020 for consistency in reporting, as in Table 7.

Table 7. Adverse Event and Device Deficiency Definitions

General	
Adverse Event (AE)*	Any untoward medical occurrence, unintended disease or injury, or untoward clinical signs (including abnormal laboratory findings) in subjects, users or other persons, whether or not related to the investigational medical device and whether anticipated or unanticipated. NOTE 1: This definition includes events related to the investigational medical device or the comparator. NOTE 2: This definition includes events related to the procedures involved. NOTE 3: For users or other persons, this definition is restricted to events related to investigational medical devices or comparators. (ISO 14155:2020 section 3.2) *The ISO 14155 definition is equivalent to AE under KGCP Article 2 item M.
Adverse Device Effect (ADE)*	Adverse event related to the use of an investigational medical device NOTE 1: This definition includes adverse events resulting from insufficient or inadequate instructions for use, deployment, implantation, installation, or operation, or any malfunction of the investigational medical device. NOTE 2: This definition includes any event resulting from use error or from intentional misuse of the investigational medical device. NOTE 3: This includes 'comparator' if the comparator is a medical device. (ISO 14155:2020 section 3.1) * The ISO 14155 definition is equivalent to ADE under KGCP Article 2 item N.
Unanticipated Adverse Device Effect (UADE)	Deviation from the aspect of ADEs or the degree of harm reflecting from the available medical device related information such as investigator's brochure or medical device package insert (KGCP Article 2 item P)
Device Deficiency (DD)	Inadequacy of a medical device with respect to its identity, quality, durability, reliability, usability, safety or performance NOTE 1: Device deficiencies include malfunctions, use errors and inadequacy in the information supplied by the manufacturer including labeling. NOTE 2: This definition includes device deficiencies related to the investigational medical device or the comparator. (ISO 14155:2020 section 3.19)
Relatedness	
Study Device	An AE that results from the presence or performance of any component of the system and its compatible components

Study Procedure	An AE that occurs due to any procedure related to the Hugo™ RAS System
Underlying condition or disease	Event related to condition or disease of the subject
Seriousness	
Serious Adverse Event (SAE)*	<u>Adverse event that led to any of following:</u> 1) death 2) a serious deterioration in the health of the subject, users, or other persons as defined by one or more of the following: - A life-threatening illness or injury, or - A permanent impairment of a body structure or a body function including chronic diseases, or - In-patient or prolonged hospitalization, or - Medical or surgical intervention to prevent life-threatening illness or injury or permanent impairment to a body structure or a body function, 3) foetal distress, foetal death or a congenital abnormality or birth defect including physical or mental impairment NOTE 1: Planned hospitalization for a pre-existing condition, or a procedure required by the CIP, without serious deterioration in health, is not considered an SAE. (ISO 14155:2020 section 3.45) * The ISO 14155 definition is equivalent to SAE under KGCP Article 2 item O.
Serious Adverse Device Effect (SADE)*	Adverse device effect that has resulted in any of the consequences characteristic of a serious adverse event. (ISO 14155:2020 section 3.44) * The ISO 14155 definition is equivalent to SADE under KGCP Article 2 item O.
Unanticipated Serious Adverse Device Effect (USADE)	Serious adverse device effect which by its nature, incidence, severity or outcome has not been identified in the current risk assessment NOTE 1: Anticipated Serious Adverse Device Effect (ASADE) is an effect which by its nature, incidence, severity or outcome has been identified in the risk assessment. (ISO 14155:2020 section 3.51)

Unavoidable AEs are those that, according to the investigator's opinion, are inherent to the procedure and are expected to occur in all subjects for an expected duration. Unavoidable AEs will not be captured or reported unless the AE worsens or persists outside the stated timeframe. Unavoidable AEs include, but are not limited to, events listed in Table 8.

Table 8. Unavoidable Adverse Events

Unavoidable Event Description	Hours from the procedure
Anesthesia related nausea/vomiting)	24
Low-grade fever (<37.8°C)	48
Incisional pain	72
Sleep problems (insomnia)	72
Constipation	72
Mild to moderate bruising/ecchymosis	168

The sponsor will utilize MedDRA for Regulatory Activities, to assign a MedDRA term for each AE/DD based on the information provided by the investigator. AE classification responsibilities listed below in Table 9.

Table 9. Adverse Event Classification Responsibilities

What is classified?	Who classifies?	Classification parameters
Relatedness	Investigator, Sponsor	Levels of causality will be assessed and categorized as "Not related", "Possible", "Probable", or "Causal" for each of following parameters: Study Device, Study Procedure, Underlying condition or disease - Not related: The relationship with the use of the device seems not relevant and/or the event can be reasonably explained by another cause, but additional information may be obtained. - Possible: The relationship with the use of the investigational device is weak but cannot be ruled out completely. Alternative causes are also possible (e.g., an underlying or concurrent illness/ clinical condition or/and an effect of another device, drug or treatment). Cases were relatedness cannot be assessed or no information has been obtained should also be classified as possible. - Probable: The relationship with the use of the investigational device seems relevant and/or the event cannot reasonably be explained by another cause, but additional information may be obtained. - Causal: The event is associated with the investigational device or with procedures beyond reasonable doubt when one of followings is met: ▪ the event is a known side effect of the product category the device belongs to or of similar devices and procedures ▪ the event has a temporal relationship with investigational device use/application or procedures ▪ the event involves a body-site or organ that the investigational device or procedures are applied to; investigational device or procedures have an effect on

What is classified?	Who classifies?	Classification parameters
		▪ the event follows a known response pattern to the medical device (if the response pattern is previously known) ▪ the discontinuation of medical device application (or reduction of the level of activation/exposure) and reintroduction of its use (or increase of the level of activation/exposure), impact on the event (when clinically feasible) ▪ other possible causes (e.g., an underlying or concurrent illness/clinical condition or/and an effect of another device, drug or treatment) have been adequately ruled out ▪ harm to the subject is due to error in use ▪ the event depends on a false result given by the investigational device used for diagnosis, when applicable
Severity	Investigator	Severity will be assessed and categorized as ”Negligible”, “Minor”, “Moderate”, “Major”, or “Critical”. - Negligible: No/minimal impact on the patient’s health condition - Minor: Presence or risk of temporary problem on the patient’s health condition, regardless of underlying diseases of the patient - Moderate: Presence or risk of reversible reduction in function (sensory, motor, physiological, or cognitive) on the patient’s health condition, regardless of underlying diseases of the patient - Major: Presence or risk of permanent reduction in function (sensory, motor, physiological, or cognitive) on the patient’s health condition, regardless of underlying diseases of the patient - Critical: Presence or risk of death or serious irreversible impairment in function (sensory, motor, physiological, or cognitive) on the patient’s health condition, regardless of underlying diseases of the patient
Seriousness	Investigator, Sponsor	SAE, SADE, DD with SADE potential
Expectedness	Sponsor	UADE, USADE
Diagnosis	Investigator	Based on presenting signs and symptoms and other supporting data
	Sponsor	MedDRA term (System Organ Class and Preferred Term) assigned based on the data provided by the investigator

In addition, all post-operative AEs will be classified by the investigator according to the Clavien-Dindo classification system below in Table 10.

Table 10. Clavien-Dindo Classification

Grade[16]	Description
Grade I	Any deviation from the normal post-operative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions. Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside.
Grade II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications Blood transfusions and total parenteral nutrition are also included.
Grade III	Requiring surgical, endoscopic or radiological intervention Grade IIIa: Intervention not under general anesthesia Grade IIIb: Intervention under general anesthesia
Grade IV	Life-threatening complication (including central nervous system complications)* requiring intermediate care or intensive care unit management Grade IVa: Single organ dysfunction (including dialysis) Grade IVb: Multiorgan dysfunction *Brain hemorrhage, ischemic stroke, subarrachnoidal bleeding, but excluding transient ischemic attacks.
Grade V	Death of a patient

10.3. Reporting of Adverse Events and Device Deficiencies

Regulatory reporting of AEs and DDs will be recorded and reported according to local regulatory requirements. Refer to Table 11 for a list of required investigator and Medtronic reporting requirements and timeframes.

Table 11. Safety Reporting Requirements

SAEs	
Investigator shall submit to:	
Medtronic	Report to the sponsor, without unjustified delay, all serious adverse events.
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
Sponsor shall submit to:	
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
ADEs	
Investigator shall submit to:	

Medtronic	Submit in a timely manner after the investigator first learns of the effect.
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
Sponsor shall submit to:	
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
SADEs, UADEs, USADEs	
Investigator shall submit to:	
Medtronic	Immediately after the investigator learns of the event or of new information in relation to an already reported event.
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
Sponsor shall submit to:	
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
Investigators	Submit per local reporting requirement.
All other reportable AEs	
Investigator shall submit to:	
Medtronic	Submit in a timely manner after the investigator first learns of the event.
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
DDs with SADE potential	
Investigator shall submit to:	
Medtronic	Submit or report as required per local reporting requirements.
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
Sponsor shall submit to:	
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.
All other Device Deficiencies	
Investigator shall submit to:	
Medtronic	Submit in a timely manner after the investigator first learns of the deficiency.
Regulatory authorities	Submit to regulatory authorities per local reporting requirement.
IRB	Submit to IRB per local reporting requirement.

11. Data Review Committees

Not applicable

12. Ethical and Administrative Considerations

12.1. Statement(s) of Compliance

This study shall be conducted in compliance with the Declaration of Helsinki, applicable regulatory requirements in Korea including the Medical Device Act and its subordinate laws and regulations, Personal Information Protection Act, and Korea Medical Devices Industry Association Fair Trade Competition, the CIP, the CTA, and the site IRB requirements.

The principles of the Declaration of Helsinki have been implemented through the IC process, IRB approval, study training, clinical trial registration, pre-clinical testing, risk-benefit assessment and publication policy. Ultimately, the sponsor and investigators will follow and comply with relevant laws and regulations.

The sponsor shall avoid improper influence on or inducement of the subject, monitor, investigators or other parties participating in or contributing to the clinical investigation. In addition, investigators shall avoid improper influence on or inducement of the subject, sponsor, monitor, other investigator(s) or other parties participating in or contributing to the clinical investigation. Pediatric, legally incompetent, or other vulnerable subjects are not eligible for the study.

The study will be publicly registered prior to in accordance with the Declaration of Helsinki on ClinicalTrials.gov (http://clinicaltrials.gov) or CRIS (http://cris.nih.go.kr). Approval of the CIP and CIP amendments is required from the following groups prior to any study procedures at a study site: The sponsor, principal investigators, MFDS, and the site IRB.

12.2. CIP Amendments

Any revisions or amendments to the CIP or IC document, will be submitted to the MFDS and/or IRBs along with a statement of justification for changes, for their approval prior to implementing the amendment. All amendments to the CIP shall be agreed upon between Medtronic and the principal investigator(s), or the coordinating investigator. Subject enrollment must stop until the amendment is approved.

Minor amendment including administrative changes to the CIP will be submitted to the MFDS and/or IRB for notification, if applicable. Minor amendments do not necessarily require MFDS approval.

12.3. Role of the Investigation Site

The head of the study site shall establish IRB which operates independently in the institution and provide SOPs to help the IRB execute its duties. In addition, the head of the study site shall ensure that the site

facility, professional staff, and appropriate measures for an emergency are prepared for the precise execution of the study. The study site shall:

- Be designated as the Medical Device Clinical Trial Institute per the Regulation for Designation of Medical Device Clinical Trial Institute (MFDS Notification No. 2017-55. Jun 27, 2017)
- Be able to enroll the required number of eligible subjects needed for the study
- Ensure that it has one or more qualified investigators, a qualified investigational study site team and adequate facilities for the foreseen duration of the clinical investigation

Prior to performing study related activities, all regulatory requirements shall be fulfilled, including, but not limited to the following:

- MFDS and IRB approval of the current version of the CIP and IC
- Fully executed CTA
- CV of investigators
- Documentation of delegated tasks
- Documentation of study training

12.4. Role of the Institutional Review Board

The IRB shall be organized and operates according to applicable laws and regulations to safeguard the rights, safety, and well-being of all study subjects. The IRB shall implement expedite review in case of followings: improper consent process, the study is not conducted per the CIP, or unanticipated serious harm to subjects such as SAE or SADE reporting.

12.5. Role of the Investigators and Study Staff

All investigators managing the subject's condition must be qualified practitioners and experienced in the diagnosis and treatment of subjects with study specific conditions (i.e., prostate cancer, cholelithiasis, cholecystitis, or gallbladder polyps). All physicians must be experienced and/or trained in the handling of the investigational device and the study procedure.

The role of the principal investigator is to implement and manage the day-to-day conduct of the clinical investigation as well as ensure data integrity and the rights, safety and well-being of the subjects involved in the clinical investigation. The principal investigator shall:

- Be qualified by education, training, and experience to assume responsibility for the proper conduct of the clinical investigation
- Be experienced in the field of application and training in the use of the Medtronic Hugo™ RAS System

- Disclose potential conflicts of interest, including financial, that interfere with the conduct of the clinical investigation or interpretation of results

All study site staff must be trained on the current version of the CIP as well as on the applicable study requirements depending on their role and must be delegated by the principal investigator to perform study related activities. In case of delegated task changes (e.g., new member join the study site team), they will receive training on the applicable study requirements relevant to their role before contributing to the study. Certification of study site personnel training will be documented.

12.6. Role of the Sponsor

The sponsor shall ensure that trials are conducted in compliance with the CIP, and the applicable regulatory requirements. In addition to performing monitoring and auditing activities, sponsor representatives may provide support at the study site as required for the study, including:

- Provide study training relevant and pertinent to the involvement of personnel conducting study activities and investigator responsibilities
- Technical support at under the supervision of a study investigator, but no data entry, shall be performed by Medtronic personnel or their representatives at study sites

In addition, for this study, sponsor representatives may be authorized by the principal investigator to perform the following significant trial related duties:

- Support study investigators in performing the study procedure
- Support data collection during the procedure and device testing
- Support data collection during the study follow-up visit

12.7. Data Management

Data will be collected using an electronic data management system for studies. eCRF data will be stored in a secure, password-protected database which will be backed up nightly.

Data will be reviewed using programmed and manual data checks to ensure the accuracy, completeness, and consistency. Data queries will be made available to study sites for resolution. At the end of the study, the data will be frozen and will be retained by the sponsor in accordance with applicable regulations. All records and other information about subjects participating in this study will be treated as confidential. Data will be transferred and processed by Medtronic or a third party designated by Medtronic in a key coded form.

The investigator's signature for specific eCRFs will be documented in compliance with local regulations. Changes to data previously submitted to the sponsor will require a new electronic signature by the investigator to acknowledge/approve the changes.

12.8. Monitoring

It is the responsibility of the sponsor to ensure monitoring of this study. Trained sponsor representatives may perform study monitoring at the study site in order to ensure that the study is conducted in accordance with the CIP, the CTA, and applicable regulatory requirements. These representatives must therefore be allowed direct access to the subjects' medical records, and other source data/documentation) upon request.

Monitoring visits will be conducted at the start, during and at the closure of the study in accordance with Medtronic SOPs and the Monitoring Plan. Frequency of monitoring visits may be based upon subject enrollment, study compliance, number of events or deviations, observations from previous monitoring visits and any suspected inconsistency in data that requires investigation.

Monitors review study compliance by identifying non-compliance and provide study site personnel with recommendations for preventative/corrective actions. Monitors may work with study personnel to determine appropriate corrective action recommendations and to identify trends within the study or at a particular study site.

12.9. Direct Access to Source Data/Documents

The sponsor, the site IRB, or MFDS may conduct site visits for the purpose of monitoring, audit, or regulatory inspection of the study site to verify the performance of the monitoring process and the study conduct. The investigators and/or study site will permit direct access to original source data/documents per applicable laws and regulations by signing the CTA.

12.10. Confidentiality

Subject confidentiality will be maintained throughout the study to the extent permitted by law. Study sites will assign a unique subject identification (SID) number to each subject. The SID number is to be recorded on all study documents to link them to the subject's medical records at the study site. Any information which would identify the subject shall not leave the site. Confidentiality of data will be observed by all parties involved at all times throughout the clinical investigation. All data shall be secured against unauthorized access.

The privacy of each subject and confidentiality of his/her information shall be preserved in reports and when publishing any data. To maintain confidentiality, the subject's name or any other sensitive information should not be recorded on any study document other than the IC. In the event of inability to

blind the identification (e.g., digital media), it will be handled in a confidential manner by the authorized personnel.

Data relating to the study might be made available to third parties (e.g., auditors or regulatory inspectors), provided the data are treated as confidential and that the subject's privacy is guaranteed. No identifiable subject information will be published under any circumstance.

12.11. Liability/Insurance Information

Medtronic Korea Ltd. is a wholly owned subsidiary of Medtronic, which as the parent company of such entity maintains appropriate clinical trial liability insurance coverage as required under applicable laws and regulations and will comply with applicable local law and custom concerning specific insurance coverage. If required, a clinical trial insurance statement/certificate will be provided to the IRB.

12.12. Treatment after the Completion of the Trial

The investigator shall ensure that subject who dropped out or terminated early will receive alternative treatment. In case of study suspension or termination, the site shall provide subjects treatment per local standard practices. Treatment after the completion of the study shall comply with the standard medical care of the site, and the subject shall cover his/her treatment at own expense.

12.13. Record Retention

According to the Medical Device Act Enforcement Regulation, all study-related documents must be retained for a period of at least 3 years after product approval (or longer if required by Medtronic SOPs). Study records include the CIP with any/all amendments, all correspondence with and approval from the MFDS and IRB, the CTA, the Investigator Statement, individual subject records, and signed ICFs, etc. Medtronic will inform the investigator/study site when these documents are no longer required to be retained.

No study document or record will be destroyed without prior written agreement between the sponsor and investigator. The investigator should take measures to prevent accidental or premature destruction of documents. Should the investigator wish to assign the study records to another party or move them to another location, advance written notice must be given to the sponsor. The sponsor will not store any personal data longer than necessary and always in line with the required storage periods.

12.14. Reporting Requirements

The investigator is responsible for the preparation (review and signature) and submission to the sponsor of all CRFs, AEs and ADEs (reported per the country-specific collection requirements), DDs, and any

deviations from the CIP. If any action is taken by an IRB with respect to this study, copies of all pertinent documentation must be forwarded to sponsor in a timely manner. Reports are subject to inspection and to the retention requirements as described above for investigator records. The investigator shall prepare and submit in a complete, accurate and timely manner the reports listed in Table 12.

Table 12. Investigator Reports Applicable per Medtronic Requirements

Report	Submit to	Description/Constraints
Withdrawal of IRB approval	Sponsor and MFDS	The investigator must report a withdrawal of approval by the reviewing IRB of the investigator's part of the investigation within 5 working days.
Study Deviations	Sponsor and IRB	Any deviation from the clinical investigational plan shall be recorded together with the explanation of the deviation. Notice of deviations from the CIP to protect the life or physical well-being of a subject in an emergency shall be given as soon as possible, but no later than 5 working days after the emergency occurred. Except in such emergency, prior approval is required for changes in the plan or deviations.
Adverse Events	Sponsor and IRB	Report according to reporting timelines provided in Table 11.
Final Report	IRBs and MFDS	This report must be submitted within 3 months of study completion or termination.

12.15. Publication and Use of Information

Publications from this study will be handled according to Medtronic SOPs and as indicated in the CTA. Medtronic, as the sponsor and the owner of the data, can use the data and/or any results derived from the data or publications based on that data for marketing purposes, further research and development of devices or educational use.

12.16. Planned Study Closure

When all planned procedures are completed per the CIP, the sponsor will distribute a study closure letter to the MFDS and IRB. Upon study closure, the study data will be reviewed, validated and frozen for the analysis. Then the sponsor shall analyze the study data and submit the clinical trial report. The study closure process is complete upon distribution of the final clinical trial report or after final payments, whichever occurs last.

12.17. Suspension or Early Termination

The sponsor, IRB or MFDS may decide to suspend or prematurely terminate an investigation site or the study itself when applicable. Early Termination is the closure of a study that occurs prior to meeting the primary objective. Suspension is a temporary postponement of study activities related to enrollment and distribution of the product. Possible reasons for considering suspension or termination of the study include but are not limited to:

- AEs associated with the system or product under investigation which might endanger the safety or welfare of the subject
- Observed/suspected performance different from the product's design intent
- Decision by Medtronic or MFDS
- Technical issues during the manufacturing process
- Failure to obtain initial IRB approval or annual renewal of the study
- Persistent non-compliance to the clinical investigation (e.g., failure to adhere to inclusion/exclusion criteria, failure to follow subjects per scheduled follow-ups)
- Lack of enrollment
- Noncompliance to regulations and the terms of the CTA (e.g., failure to submit data in a timely manner, failure to follow-up on data queries and monitoring observations in a timely manner, etc.)
- IRB suspension of the study site
- Fraud or fraudulent misconduct is discovered (as defined by local law and regulations)
- Investigator request (e.g., no longer able to support the study)

If the study is suspended or prematurely terminated, the sponsor shall promptly inform the investigator(s) of the termination or suspension and the reason(s) for this. The investigator shall then promptly inform the reviewing IRB (if required) and the study subjects and ensure appropriate care and follow-up is provided. In the case of a study suspension, subject enrollment must stop until the suspension is lifted by the sponsor. However, enrolled subjects should continue to be followed out of consideration of their safety, rights and welfare.

The investigator shall not withdraw a subject's study participation unless compelling medical justification is present. Every attempt will be made to complete the subject's study per the CIP, and regular telephone follow-up is acceptable to have the subject engage in study procedures. However, when the risks are found to outweigh the potential benefits or when there is conclusive proof of definite outcomes, investigators must assess whether to continue, modify or immediately stop the study in the respective site and immediately inform the sponsor and IRB, if applicable.

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14. Appendices

14.1. Investigator Agreement and Signature Page

Provided under separate cover

14.2. List of the Investigators and Study Staff

Provided under separate cover

14.3. Investigational Device and Compatible Components

Provided under separate cover

14.4. Instructions for Use/Labeling

Provided under separate cover

- Hugo™ RAS System Instructions for Use
- Hugo™ RAS Wristed Instructions for Use
- VersaOne™ Bladeless Positioning Trocar System and Universal Cannula Positioning Trocar System Instructions for Use
- VersaOne™ Reusable Positioning Trocar System Instructions for Use
- Setup Guide for Cholecystectomy
- Setup Guide for Prostatectomy

14.5. Sample Informed Consent Form

Provided under separate cover

14.6. Sample Case Report Form

Provided under separate cover

14.7. Foreseeable Adverse Event List

Provided under separate cover

14.8. Precautions

Provided under separate cover

15. Version History

Version	Summary of Changes	Author(s)/Title
1.0	New Document	Eunkyung Jung, Clinical Research Specialist
2.0	Following amendments are made upon MFDS feedback on version 1.0: - Study background: Provided summary of pre-clinical studies and cadaveric studies - Inclusion criteria: Added definition of clinically localized prostate cancer - Exclusion criteria: Added ECOG Performance Status ≥ 2 - Removed selection criteria for surgeon - Investigational device: Provided comparison between the investigational device and locally commercialized devices, added appropriate action in case of cybersecurity incident - Study measurements • Added pre-operative test items • Provided key procedural steps including port placement and arm positioning • Added post-operative imaging for prostatectomy subjects • Added post-operative follow-up visits for prostatectomy subjects • Changed frequency of vital signs/laboratory assessments - Study endpoints: Combine the primary effectiveness endpoint and the primary safety endpoint into single composite endpoint - Statistical methods: Revised the definition of per-protocol set, provided the method of statistical testing - Removed Section 9. Risks and Benefits - Other minor corrections (e.g., typos)	Eunkyung Jung, Clinical Research Specialist
3.0	- Moved the list of sub-investigators, investigational device managers, and sponsor representatives to Appendix 14.2 - Changed port placement and arm positioning figures for cholecystectomy - Moved and added details on investigational device and components to Appendix 14.3 - Updated amendment date of applicable local regulations	Eunkyung Jung, Senior Clinical Research Specialist
4.0	Following amendments are made upon MFDS feedback on version 3.0: - Study background: Removed the summary of risks and benefits	Eunkyung Jung, Senior Clinical Research Specialist

	- Investigational device: Added images of surgeon console, arm carts, and system tower, removed description on the comparison between the investigational device and locally commercialized devices, added a summary of the instructions for use - Inclusion criteria: Added detailed description for gallbladder polyps - Exclusion criteria: Removed BMI ≥ 35, ECOG Performance Status ≥ 2 - Sample size: Revised according to previous research results and updated the target performance - Study measurements: Changed port placement and arm positioning figures for cholecystectomy - Study endpoints: Updated wording of primary endpoint definition (i.e., “any system-related major complication” to “any major complication”) - Statistical methods: Added details in the definition of full analysis set	
5.0	Minor changes are made upon MFDS amendment request on version 4.0: - Investigational device: Inserted a paragraph that the system does not support hospital network or other Ethernet connectivity - Statistical methods: Added details in the analysis set definition	Eunkyung Jung, Senior Clinical Research Specialist
6.0	Updates made to align to the updated SOP template 056-F275, Rev E Following changes are made to clarify data collection requirements: - Study measurements: Added takedown time, changes to port placement, delay in robot setup time, and delay in total operative time; added definition of robot setup time, removed pre-operative test results (e.g., electrocardiography, chest X-ray, pulmonary function test, echocardiography, and some laboratory values including urine tests, coagulation, and serology) from data collection, clarified which concomitant medications should be collected, and added window period for Day 7 visit for prostatectomy patients (i.e., ±3 days), allowed data collection in case of an unscheduled visit - Investigational device: Removed optional storage requirement for study device - Safety reporting: Update Table 11 and Table 12 regarding reporting timeframe upon the country and site IRB reporting requirements and combine the two tables into one - Statistical methods: Add descriptive analyses for added measurement items during procedure	Eunkyung Jung, Senior Clinical Research Specialist