

**Supplementary Table S1**—Complete breakdown and comparison of robotic and laparoscopic cholecystectomy.

Step	#	Robotic Process	Robotic Sub-Process definitions	Median RC Time (min), range	LC Times (min)	Difficulty difference compared to laparoscopy* (0-5)
Prep of operative field	1	Surgical Robot set up & patient positioning	Dorsal recumbency with right oblique and reverse Trendelenburg	5.5 (4-8)	5, 5	2
			<b>PSC positioned at head of table</b>	5 (3-7)	NA	0, 3
	2	Pneumoperitoneum & port placement	Placement of first trocar via Hasson technique & creation of pneumoperitoneum	4 (3-5)	3, 4	2
			Placement of camera and secondary ports under visualization	9.5 (7-10)	6.5, 7	2
	3	Initiation of console, ensuring robot is docked safely	<b>Appropriate docking of the robotic arms to ports</b>	5 (3-6)	NA	0, 3
			<b>Verifying adequate range of motion to all arms</b>	14.5 (10-20)	NA	0, 4
			Placement of all instruments in appropriate positions for procedure to begin	*	*	2
			<b>Surgeon console set up- appropriate positioning and fit of master grips</b>	4 (2-5)	NA	0, 2

	4	Adhesiolysis (if necessary)	Sharp or cautery adhesiolysis if necessary	1.3, 3.3	NA	2
Dissection of cystic duct & ligature placement	5	Grasp gallbladder fundus	Placement of liver retractor through laparoscopic port (if necessary)	*	*	1
			Grasping of gallbladder fundus (4 <sup>th</sup> port) & locking of instrument	*	NA-no locking function	1
	6	Expose cystic duct and common bile duct	Retraction of liver parenchyma with appropriate robotic or laparoscopic instrumentation	1 (0.5-4min)	Retraction with fan retractor or cobra 7,12	1
	7	Dissection of cystic duct	Dissection of cystic duct in correct plane in Calot's space with robotic monopolar Metzenbaum scissors	6 (3.5-8)	13,18	1
			Avoid instrument collisions & excessive force errors	^	^	3
			Hemorrhage control of liver parenchyma with L-hook monopolar device	^	^	2
	8	Identification of cystic artery	Identification and ligation or sealing of cystic artery with bipolar device	*	*	2
	9	Placement of cystic duct ligatures	Placement of suture within abdomen under visualization	*	*	2
			Exchange of monopolar scissors	*	*	2

			in port 3 for needle drivers			
			Exchange of fenestrated graspers in port 2 for needle drivers	*	*	2
			Ligation of cystic duct with three encircling suture (replacement of additional lengths of suture as necessary)	10 (5-13)	12,14	1
Transection of cystic duct & gallbladder dissection	10	Transection of cystic duct	Replacement of needle drivers in port 3 with monopolar scissors	*	*	2
			Replacement of needle drivers in port 2 with fenestrated graspers	*	*	2
			Transection of cystic duct	*	*	2
	11	Re-grasping of gallbladder (if necessary)	Re-grasping of gallbladder fundus for better visualization for dissection (if necessary)	*	*	1
			Grasping of cystic duct for better visualization for dissection (if necessary)	*	*	1
	12	Dissection of gallbladder from liver parenchyma	Identify gallbladder serosa and incise capsule	*	*	2
			Dissect gallbladder subserosally with monopolar scissors or bluntly with fenestrated graspers	31 (24-39)	35,42	1

			Identification and cauterization/sealing of vessels penetrating capsule from hepatic parenchyma	^	^	1
Removal of gallbladder & closure	13	Inspection and removal of gallbladder	Hemostasis to liver parenchyma as necessary	^	^	2
			Replacement of monopolar scissors with specimen bag (port 3)	*	*	2
			Placement of gallbladder within bag Removal of specimen bag under visualization	1.5 (1.5-3)	2, 2	2
	14	Closure	Remove instruments	1.5 (1-3)	*	2
			<b>Robot undocked from ports appropriately and movement of PSC from surgical table</b>	4.5 (4-6)	NA	0, 2
			Close skin	5 (5-7)	5,6	2

PSC= patient side cart. Subjective difficulty score: 0= not performed in laparoscopy, 1=easier than laparoscopy, 2= same as laparoscopy, 3= harder than laparoscopy. If procedure not performed in laparoscopy (bolded), second number denotes difficulty of procedure by Likert score: 1= very easy, 2= moderately easy, 3= medium, 4= difficult, 5= extremely difficult.

\*= procedure required less than 30 seconds to perform

^= procedure occurred at multiple times throughout procedure for short periods of time (2-3 seconds)