Robotic-Assisted Pyeloplasty Using the da Vinci Surgical Systems compared to Laparoscopic or Open Approach: A systematic Literature Review and Meta-analysis

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Supplementary File

Table 1: Study characteristics of included studies (n=14)

Ref. #	Study	Country	Study type	Study period	Database name/Institution	Paper cohorts Analyzed	No. of patients		
							dV-RAS	Lap	Open
1	Bird 2011	USA	RETRO	1999-2009	University of Miami, Miller School of Medicine Department of Urology, Miami, Florida, USA	R, L	98	74	
2	Carmona 2022	Israel	RETRO	2003-2022	Chaim Sheba Medical Center, Tel Hashomer, Israel; Sackler School of Medicine, Tel-Aviv University, Tel-Aviv, Israel	R, L	41	24	
3	Hemal 2010	India	RETRO	RAS: 07/2006-07/2007 Lap: 2005-2006	All India Institute of Medical Sciences, New Delhi, India	R, L	30	30	
4	Hong 2018	China	RETRO	10/2009-11/2017	Data from 2 medical institutions: Peking University First Hospital, Institute of Urology, Peking University, National Urological Cancer Center, Beijing, China; Southwest Hospital, Third Military Medical University, Chongqing, China	R, L	140	76	
5	Jha 2022	India	RCT	06/2015-03/2018	Military Hospital, Secunderabad, Telangana, India; Base Hospital Delhi Cantt, New Delhi, India; Army Hospital Research and Referral, New Delhi, India; Command Hospital Air Force, Bengaluru, Karnataka, India; Command Hospital, Udhampur, Jammu and Kashmir, India	R, L	29	29	

6	Lucas 2012	USA, Canada	RETRO	NR	Retrospective database containing data submitted by all sites with Endourological Society recognized fellowships or active members of the Society of Urological Robotic Surgery	R, L	485	274	
7	Monn 2013	USA	DB	2005-2010	Nationwide Inpatient Sample database (NIS)	R, L, O	779	102	761
8	Moretto 2023	Italy	RETRO	01/2012-01/2022	Università Cattolica del Sacro Cuore di Roma, Fondazione Policlinico Universitario Agostino Gemelli,Rome, Italy	R, O	43		48
9	Murali 2021	UK	RETRO	09/2007-01/2020; RAS: 10/2015-01/2020 Lap: 09/2007-09/2015	Royal Stoke University Hospital, University Hospitals of North Midlands NHS Trust, Stoke-on-Trent; Royal Shrewsbury Hopsital, Shrewsbury, UK	R, L	45	71	
10	Pahwa 2014	India	RETRO	NR	Sir Ganga RamHospital, Gurgaon, India; Lady Hardinge Medical College, New Delhi, India	R, L, O	30	30	30
11	Pyrgidis 2024	Germany	DB	2005-2021	GeRmAn Nationwide inpatient Data (GRAND)	R, L, O	6878	12761	28781
12	Rasool 2019	India	PRO	06/2015-06/2018	Department of Urology, Institute of Renal Sciences at Sir Ganga Ram Hospital, New Delhi, India	R, L, O	34	34	34
13	Rühle 2017	Switzerland	PRO	11/2004-11/2013	Urology Clinic of the Lucerne Cantonal Hospital, Switzerland	R, L	76	23	
14	Yu 2012	USA	DB	09/2008-12/2008	Nationwide Inpatient Sample	R, L, O	432	104	1047
Study type: RCT= randomized controlled trial; PRO=prospective non-randomized trial; DB= retrospective database; RETRO= retrospective cohort study.									

References: ***Pyeloplasty (n = 15)***

1. Bird VG, Leveillee RJ, Eldefrawy A, Bracho J, Aziz MS. Comparison of robot-assisted versus conventional laparoscopic transperitoneal pyeloplasty for patients with ureteropelvic junction obstruction: a single-center study. *Urology*. 2011;77(3):730-734. doi:10.1016/j.urology.2010.07.540
2. Carmona O, Dotan ZA, Haifler M, Rosenzweig B, Zilberman DE. Laparoscopic versus robot-assisted pyeloplasty in adults: a single-center experience. *J Pers Med*. 2022;12(10):1586. doi:10.3390/jpm12101586
3. Hemal AK, Mukherjee S, Singh K. Laparoscopic pyeloplasty versus robotic pyeloplasty for ureteropelvic junction obstruction: a series of 60 cases performed by a single surgeon. *Can J Urol*. 2010;17(1):5012-5016
4. Hong P, Ding G, Zhu D, et al. Head-to-head comparison of modified laparoscopic pyeloplasty and robot-assisted pyeloplasty for ureteropelvic junction obstruction in China. *Urol Int*. 2018. doi:10.1159/000492337
5. Jha AA, Sandhu AS, Dash SC, et al. Comparison of surgical and functional outcomes of laparoscopic pyeloplasty and robot-assisted pyeloplasty for congenital ureteropelvic junction obstruction. *J Urol Surg*. 2022;9(1):20-24. doi:10.4274/JUS.GALENOS.2021.2021.0024
6. Lucas SM, Sundaram CP, Wolf JS Jr, et al. Factors that impact the outcome of minimally invasive pyeloplasty: results of the multi-institutional laparoscopic and robotic pyeloplasty collaborative group. *J Urol*. 2011. doi:10.1016/j.juro.2011.09.158
7. Monn MF, Bahler CD, Schneider EB, Sundaram CP. Emerging trends in robotic pyeloplasty for the management of ureteropelvic junction obstruction in adults. *J Urol*. 2013;189(4):1352-1357. doi:10.1016/j.juro.2012.10.001
8. Moretto S, Gandi C, Bientinesi R, et al. Robotic versus open pyeloplasty: perioperative and functional outcomes. *J Clin Med*. 2023;12(7):2538. doi:10.3390/jcm12072538
9. Murali V, Donati-Bourne J, Thomas M, Luscombe C, Golash A, Fernando H. Day-case catheterless and drainless minimal-access pyeloplasty in adults: a single-center experience of 13 years. *Int J Urol*. 2021. doi:10.1111/iju.14493
10. Pahwa M, Pahwa AR, Girotra M, Abrahm RR, Kathuria S, Sharma A. Defining the pros and cons of open, conventional laparoscopy, and robot-assisted pyeloplasty in a developing nation. *Adv Urol*. 2014;2014:850156. doi:10.1155/2014/850156
11. Pyrgidis N, Volz Y, Ebner B, et al. Evolution of robotic urology in clinical practice from the beginning to now: results from the GRAND Study Register. *Eur Urol Focus*. 2024. doi:10.1016/j.euf.2024.08.004
12. Rasool S, Singh M, Jain S, et al. Comparison of open, laparoscopic, and robot-assisted pyeloplasty for pelviureteric junction obstruction in adult patients. *J Robot Surg*. 2019. doi:10.1007/s11701-019-00991-6

13. Ruehle A, Arbelaez E, Mattei A, Danuser H. The watertightness of the anastomosis after laparoscopic or robot-assisted pyeloplasty: is a drainage necessary? *J Endourol*. 2017. doi:10.1089/end.2016.0655
14. Yu HY, Hevelone ND, Lipsitz SR, Kowalczyk KJ, Hu JC. Use, costs, and comparative effectiveness of robotic-assisted, laparoscopic, and open urological surgery. *J Urol*. 2012. doi:10.1016/j.juro.2011.11.089

Included in SLR only:

1. Flegar L, Kipfer F, Durmus T, et al. Pyeloplasty and ureteral reconstruction surgery trends: a total population analysis in Germany from 2006 to 2022. *Eur Urol Open Sci*. 2024;70:116-123. doi:10.1016/j.euros.2024.10.011