

Surgeon-performed versus anesthesiologist-performed transversus abdominis plane blocks and post-operative opioid use after laparoscopic donor nephrectomy

Julia Collins, MD; Abigail Howard, MD; Dieter Adelman, MD, PhD; Michael Bokoch, MD, PhD; Pedram Aleshi, MD
University of California, San Francisco Department of Anesthesia and Perioperative Care

Introduction

- Living-donor kidney transplant is a popular option to reduce waiting times for transplant
- Laparoscopic donor nephrectomy (LDN) can result in significant post-operative pain requiring opioids
- Transversus abdominis plane (TAP) blocks help to reduce post-operative pain and opioid consumption^{1,2}
- The TAP block is a fascial plane block targeting the intercostal, subcostal, iliohypogastric, and ilioinguinal nerves, providing analgesia to the lower abdominal wall from T10 to L1
- We hypothesize that anesthesiologist-performed, ultrasound-guided TAP blocks will result in lower 24-hr post-operative oral morphine equivalent (OME) requirements compared to surgeon-performed TAP blocks in patients undergoing LDN

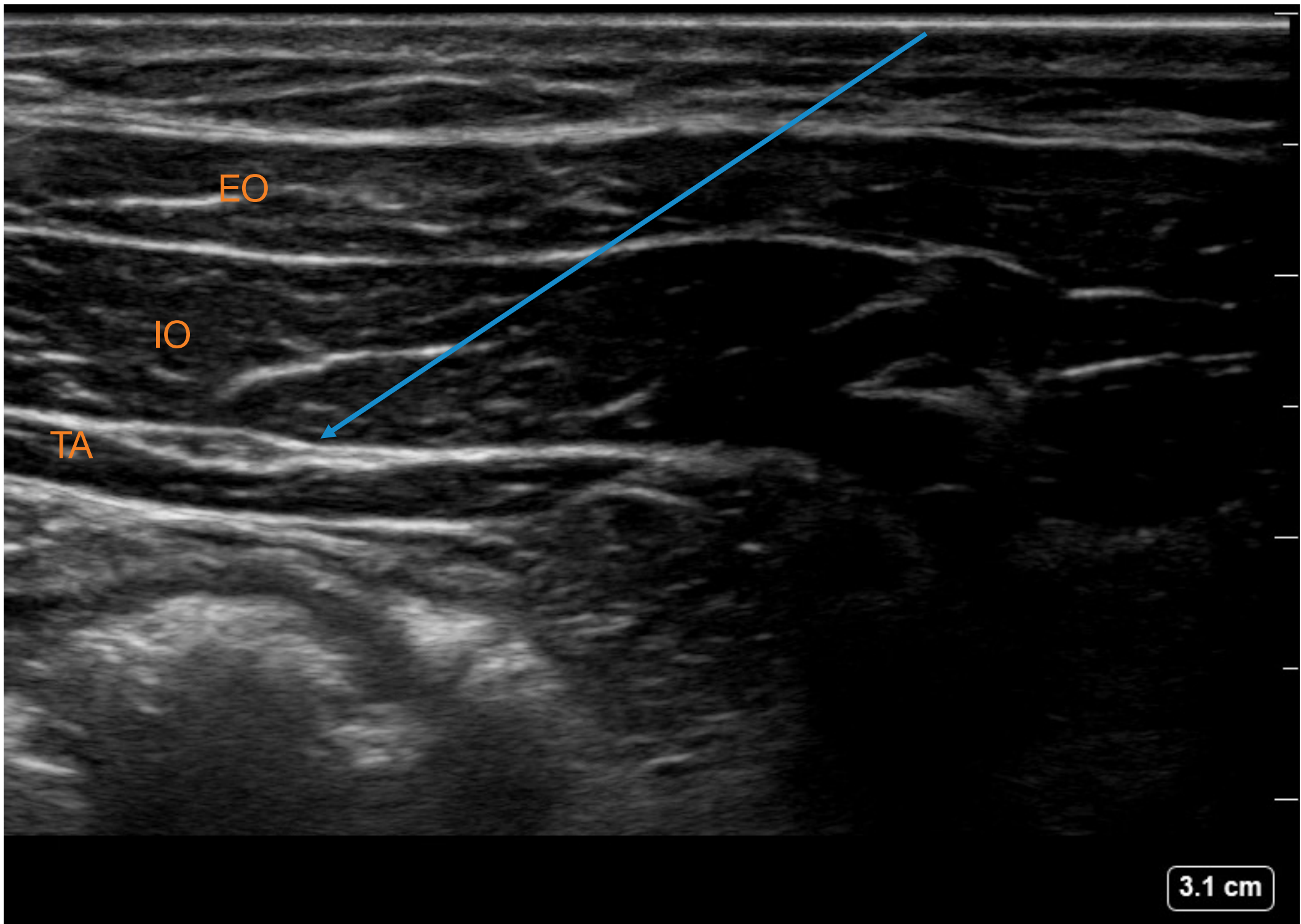


Figure 1. Sonoanatomy of TAP block in transverse view with needle path directed towards target fascial plane. EO= external oblique; IO = internal oblique; TA=transversus abdominis.

Methods and Study Design

- Retrospective cohort study design
- Primary outcome:** 24-hr post-operative oral morphine equivalent consumption

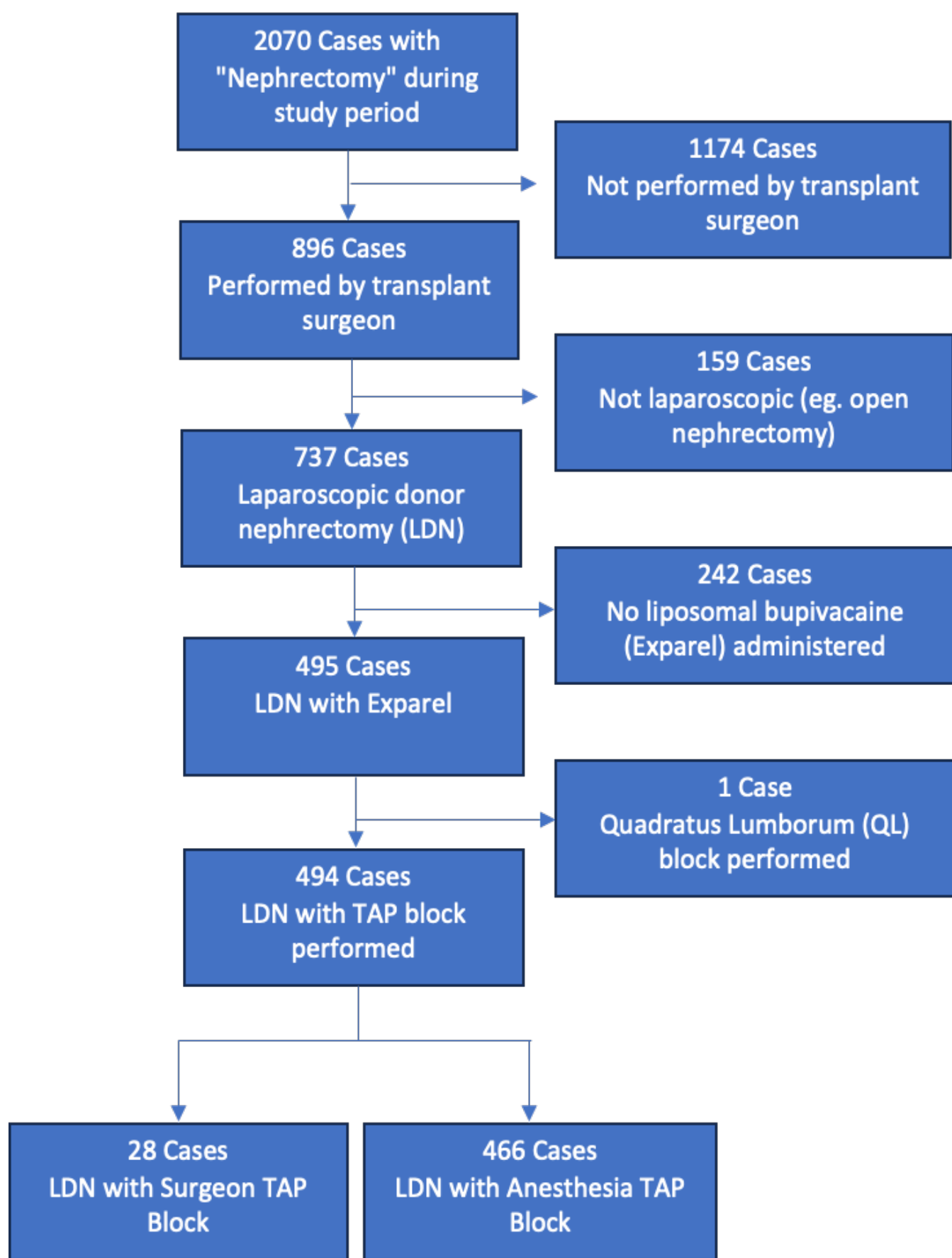


Figure 2. CONSORT diagram illustrating cohort identification from the electronic health record. CONSORT, Consolidated Standards of Reporting Trials.

Results

Table 1. Patient and cohort baseline characteristics. P-values are reported for Mann-Whitney-U tests (numeric) and Fisher's exact tests (categorical). BMI, body mass index; ASA, American Society of Anesthesiologists.

		Anesthesiologist TAP (N=466)	Surgeon TAP (N=28)	p-value
Age (y)		44 (34-55)	42 (32-49)	0.25
Sex	Female	291 (62.4%)	21 (75.0%)	0.012
	Male	175 (37.6%)	6 (21.4%)	
	Nonbinary	0 (0.0%)	1 (3.6%)	
BMI (kg/m^2)		25 (23-28)	26 (24-32)	0.13
ASA classification		1 (1-2)	1 (1-2)	0.61
Surgeon	A	165 (35.4%)	1 (3.6%)	<0.001
	B	114 (24.5%)	26 (92.9%)	
	C	121 (26.0%)	0 (0.0%)	
	D	66 (14.2%)	1 (3.6%)	

Table 2. Procedure characteristics and medications administered intra-operatively and on the day of surgery (DOS). Data are presented as median (IQR) and n (%). P-values are reported for Mann-Whitney-U tests (numeric), Fisher's exact and Chi-Square tests (categorical). APAP, acetaminophen.

	Anesthesiologist TAP (N=466)	Surgeon TAP (N=28)	p-value
Procedure characteristics:			
Operative duration (h)	2.6 (2.3-2.9)	2.5 (2.3-2.7)	0.18
Case duration (h)	3.9 (3.6-4.4)	3.8 (3.5-4.1)	0.055
Procedure end to out of room (min)	23 (13-31)	12 (6-17)	<0.001
Medications administered:			
Liposomal bupivacaine dose (mg)	266 (266-266)	266 (266-266)	0.27
Plain bupivacaine dose (mg)	125 (100-132)	50 (50-75)	<0.001
Intra-operative OME (mg)	53.2 (30-75)	56.2 (30.0-75)	0.58
Cases given APAP on DOS	464 (99.6%)	26 (92.9%)	<0.001
Cases given ketorolac given on DOS	197 (42.3%)	3 (10.7%)	<0.001
Cases given gabapentin given on DOS	138 (29.6%)	4 (14.3%)	0.089
Cases given dexamethasone on DOS	423 (90.8%)	27 (96.4%)	0.31



Table 3. Primary and secondary outcomes. P-values are reported for Mann-Whitney-U tests (numeric). NRS, numerical rating scale; PACU, post-anesthesia care unit.

	Anesthesiologist TAP (N=466)	Surgeon TAP (N=28)	p-value
OME 0-24 h postop (mg)	44.0 (22.5-70.5)	34.3 (12.0-66.8)	0.40
OME 24-48 h postop (mg)	15.0 (0.0-30.0)	15.0 (0.0-30.0)	0.76
Pain NRS in PACU, lowest	0 (0-0)	0 (0-0)	0.13
Pain NRS in PACU, worst	5 (4-8)	5 (3-8)	0.85
Pain NRS 0-24 h, worst	7 (5-8)	6 (5-8)	0.31
Pain NRS 24-48 h, worst	5 (3-7)	6 (2-7)	0.63
Length of stay, PACU (h)	2.6 (2.0-3.8)	3.2 (2.3-4.1)	0.18
Length of stay, hospital (d)	2.3 (2.2-3.2)	2.3 (2.2-3.1)	0.60

Conclusions

- No significant difference in 24-hr post-operative OME consumption
- Worst pain score in PACU and up to 24-hr remained high for both cohorts
- No difference in overall case duration
- Significantly lower doses of plain bupivacaine for surgeon-performed TAP blocks may have reduced efficacy of the block

Limitations and Next Steps

- Unequal and limited case numbers between cohorts
- Unbalanced distribution of surgeon-performed TAP blocks
- Retrospective design limits number of cases identified within study period
- A prospective randomized study with a larger sample size is needed to draw definitive conclusions
- Next steps include identifying the optimal local anesthetic dose and composition and comparing different regional techniques (e.g. erector spinae plane and quadratus lumborum blocks)

References

- Hosgood SA, Thiyagarajan UM, Nicholson HF, Jeyapalan I, Nicholson ML. Randomized clinical trial of transversus abdominis plane block versus placebo control in live-donor nephrectomy. Transplantation. 2012;94(5):520-525.
- Guner Can M, Goz R, Berber I, Kaspar C, Cakir U. Ultrasound/ laparoscopic camera-guided transversus abdominis plane block for renal transplant donors: a randomized controlled trial. Ann Transplant. 2015;20:418-423.