

Preliminary Results from a Pilot Study Utilizing Ears Protocol in Living Donor Nephrectomy

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Background/Introduction: Gastrointestinal (GI) recovery after major abdominal surgery can be delayed from ongoing need for narcotic analgesia thereby prolonging hospitalization. Enhanced recovery after surgery (ERAS) is a multimodal perioperative care pathway designed to facilitate early recovery after major surgery by maintaining preoperative body composition and physiological organ function and modifying the stress response induced by surgical exposure.¹ Enhanced recovery programs (ERPs) in colorectal surgery have decreased the duration of postoperative ileus and hospital stay while showing equivalent morbidity, mortality and readmission rates in comparison to the traditional standard of care.^{2,3} Laparoscopic living donor nephrectomy has significantly transformed the outlook for individuals considering kidney donation.⁴ However, a 30% rate of Emergency Room visits / readmission was recorded at our center in 2014 largely from delayed GI recovery. Thus, a pilot trial to utilize ERAS protocols in living kidney donors was initiated.

Methods: This is a single-center retrospective analysis comparing the outcomes of the first 14 live kidney donors subjected to laparoscopic nephrectomy with ERAS protocol to 18 donors operated prior to ERAS with traditional standard of care. Both groups were matched by patient demographics. Our ERP includes reduced duration of fasting with preoperative carbohydrate loading, intraoperative fluid restriction to 3ml/kg/hr, target urine output of 0.5 ml/kg/hr, use of sub fascial Exparel injection (Bupivacaine liposome suspension) and postoperative narcotic free pain regimen with Acetaminophen, ketorolac, tramadol.

Results: ERAS protocol reduced postoperative median length of stay decreased from 2.0 to 1.0 days (**P 0.001**). Overall pain scores were significantly lower in the ERAS group (peak pain score 6.50 vs 9.00 - **p 0.001**, morning after surgery pain score 3.00 vs 7.00 - **p 0.012**) despite absence of narcotics in the postoperative period. Average duration of surgery was shorter with the ERP as compared to the standard protocol (241 vs 277 min - **p 0.019**). Average amount of intraoperative fluid used was significantly lower in the ERAS group in comparison to standard of care protocol (2000ml vs 3000ml, **p 0.002**), without affecting the donor urine output intraoperatively or the percent change in donor serum creatinine on postop day 1 (70

vs 77, p 1.000). Incidence of delayed graft function was similar in the two groups (2 vs 1, p 0.597). A trend towards lower readmission was noted with the ERAS protocol. (2 vs 4, p 0.656). GI dysfunction was the most common reason for readmission.

		Summary Outcome Measures		
Variable	Statistics	Control (N=18)	Treatment(N=14)	P-value
Operative Time	Mean(SD)	286.28(53.89)	243.00(39.88)	
	Min---Max	167.00---391.00	189.00---312.00	0.0195
	Median	277.00	241.00	
Operative Fluid	Mean(SD)	3049.94(841.03)	2028.57(723.01)	
	Min---Max	1500.00---4700.00	1000.00---3500.00	0.0018
	Median	3000.00	2000.00	
Length of stay	Mean(SD)	2.41(1.58)	1.07(0.27)	
	Min---Max	1.00---7.00	1.00---2.00	0.0012
	Median	2.00	1.00	
Readmission	No	12(75.0%)	12(85.71%)	0.6567
	Yes	4(25.0%)	2(14.29%)	
Peak pain score	Mean(SD)	8.22(1.73)	5.93(1.90)	
	Min---Max	4.00---10.00	3.00---9.00	0.0015
	Median	9.00	6.50	
Morning pain score	Mean(SD)	5.61(2.99)	3.00(2.25)	
	Min---Max	0.00---10.00	0.00---8.00	0.0126
	Median	7.00	3.00	
Low pain score	Mean(SD)	1.39(1.65)	0.50(0.94)	
	Min---Max	0.00---5.00	0.00---3.00	0.0968
	Median	1.00	0.00	
Delayed graft function	No	14(93.3%)	12(85.71%)	

		Summary Outcome Measures		
Variable	Statistics	Control (N=18)	Treatment(N=14)	P-value
	Yes	1(6.7%)	2(14.29%)	0.5977

Conclusion: Application of ERAS protocol in laparoscopic living donor nephrectomy was associated with reduced length of hospitalization. Improved pain scores resulted from intraoperative use of sub fascial Exparel and shorter duration of ileus. This is likely related to optimizing intraoperative fluids thus preventing excessive third spacing & bowel edema which prolongs gut recovery. The restricted use of intravenous fluids during donor surgery did not adversely impact recipient graft function. This study suggests that ERAS has the potential to enhance the advantages of laparoscopic surgery for live kidney donation through optimizing donor outcomes and perioperative patient satisfaction. ERP's can further incentivize donors for undergoing laparoscopic live kidney donation.

References:

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