

PD49-10: Long-Term Functional Outcomes of Inferior Vena Cava Ligation Compared to Thrombectomy in Renal Cell Carcinoma Patients: A Retrospective, Case-Controlled Study

Lillian Xie, B.A.^{[CO]. 1}, Gordon Hong, B.S. ^{[CO]. 2}, Dattatraya Patil, B.S.³, Reza Nabavizadeh, M.D.³, Cecilia Ethun, M.D.⁴, Shishir Maithel, M.D.⁵, Kenneth Cardona, M.D.⁵, Kenneth Ogan, M.D.³, Viraj Master, M.D.³

¹Emory University School of Medicine, Atlanta, GA,

²Northeast Ohio Medical University School of Medicine, Rootstown, OH,

³Emory University School of Medicine, Dept. of Urology, Atlanta, GA,

⁴Emory University School of Medicine, Dept. of Surgery, Atlanta, GA,

⁵Emory University School of Medicine, Division of Surgical Oncology, Dept. of Surgery, Atlanta, GA

Disclosures

None



Introduction

- IVC involvement in kidney cancer in up to 4-10% of patients
- IVC ligation necessary in cases of immobile thrombus or bland thrombus
- Hesitancy to perform ligation without reconstruction:
 - Compromised renal function
 - Complications: lymphedema, chylous ascites

Methods

- Retrospectively reviewed IVC ligation vs. thrombectomy from Jan 2001 to Aug 2019
- Decision to perform IVC ligation based on intraoperative ultrasound
- Ligation patients matched to thrombectomy patients in 1:2 ratio on pre-operative Charlson Comorbidity Index, eGFR, and race
- Primary Endpoints:
 - Overall Complications (Clavien-Dindo Grade I-V)
 - Major Complications (Clavien-Dindo Grade IIIa and above)
 - Change in eGFR
 - Overall Mortality
 - Cancer-Specific Mortality

Results: Descriptive Analysis

Covariate		Ligation Cohort (n=26)	Thrombectomy Cohort (n=52)	p-value*
Preoperative Charlson Comorbidity Index	Normal	1 (4%)	5 (10%)	0.722
	Mild	11 (42%)	18 (35%)	
	Moderate	6 (23%)	15 (29%)	
	Severe	8 (31%)	14 (27%)	
Age at Surgery (years)		64 ± 9	64 ± 11	0.832
Pre-operative eGFR (mL/min/1.73m ²)		35 ± 27	39 ± 26	0.469

*The parametric p-value is calculated by ANOVA for numerical covariates and chi-square test for categorical covariates.

Results: Descriptive Analysis

Neves-Zinke Tumor Thrombus Level, Operative	Ligation Cohort (n=26)	Thrombectomy Cohort (n=52)	p-value*
Level 1	9 (35%)	37 (71%)	0.006
Level 2	0 (0%)	2 (4%)	
Level 3	12 (46%)	8 (15%)	
Level 4	5 (19%)	5 (10%)	

*The parametric p-value is calculated by ANOVA for numerical covariates and chi-square test for categorical covariates.

Results: Surgical Outcomes

Covariate	Ligation Cohort (n=26)	Thrombectomy Cohort (n=52)	p-value*
Length of Hospital Stay (days)	13.2 ± 9.8	8.8 ± 6.1	0.017
90-day Readmission (%)	5 (19%)	3 (6%)	0.065
Readmission, ever (%)	12 (52%)	17 (33%)	0.124

*The parametric p-value is calculated by ANOVA for numerical covariates and chi-square test for categorical covariates.

Results: Clavien-Dindo Complications

Complications	Ligation Cohort (n = 26)	Thrombectomy Cohort (n = 52)	p-value*
Overall, at discharge	18 (69.2%)	18 (34.6%)	0.004
Overall, 3 months	6 (23.1%)	6 (11.5%)	0.183
Overall, 6 months	4 (15.4%)	4 (7.7%)	0.291
Overall, 12 months	1 (3.8%)	5 (9.6%)	0.367
Major, at discharge	7 (26.9%)	6 (11.5%)	0.086
Major, 3 months	3 (11.5%)	1 (1.9%)	0.070
Major, 6 months	0 (0.0%)	2 (3.8%)	0.311
Major, 12 months	0 (0.0%)	2 (3.8%)	0.311

*The parametric p-value is calculated by ANOVA for numerical covariates and chi-square test for categorical covariates.

Overall complications: Clavien-Dindo grade I - V
 Major complications: Clavien-Dindo grade \geq IIIa



Results: Specific Complications

Covariate	Ligation Cohort (n = 26)	Thrombectomy Cohort (n = 52)	p-value*
Lymphedema	5 (19.2%)	3 (5.8%)	0.065
Temporary Dialysis	1 (3.8%)	0 (0.0%)	0.155
Chylous Ascites	1 (3.8%)	2 (3.8%)	1.000
Pulmonary Embolism	0 (0.0%)	2 (3.8%)	0.311

*The parametric p-value is calculated by ANOVA for numerical covariates and chi-square test for categorical covariates.

Results: Mean eGFR Change

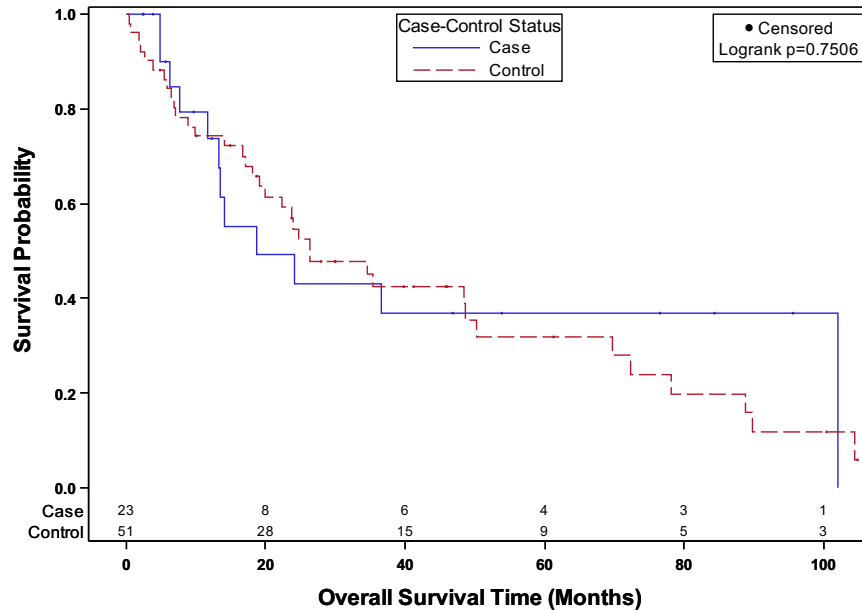
(mL/min/1.73m ²)	Ligation Cohort	Thrombectomy Cohort	p-value*
1 day Post-Op	0.7 ± 16.6	- 5.5 ± 15.7	0.111
3 months	- 18.8 ± 30.5	- 21.2 ± 28.7	0.735
12 months	- 18.8 ± 26.4	- 19.6 ± 29.3	0.926
18 months	- 19.8 ± 25.3	- 19.0 ± 27.1	0.935
> 24 months	- 12.6 ± 24.6	- 20.4 ± 30.8	0.500

*The parametric p-value is calculated by ANOVA for numerical covariates and chi-square test for categorical covariates.

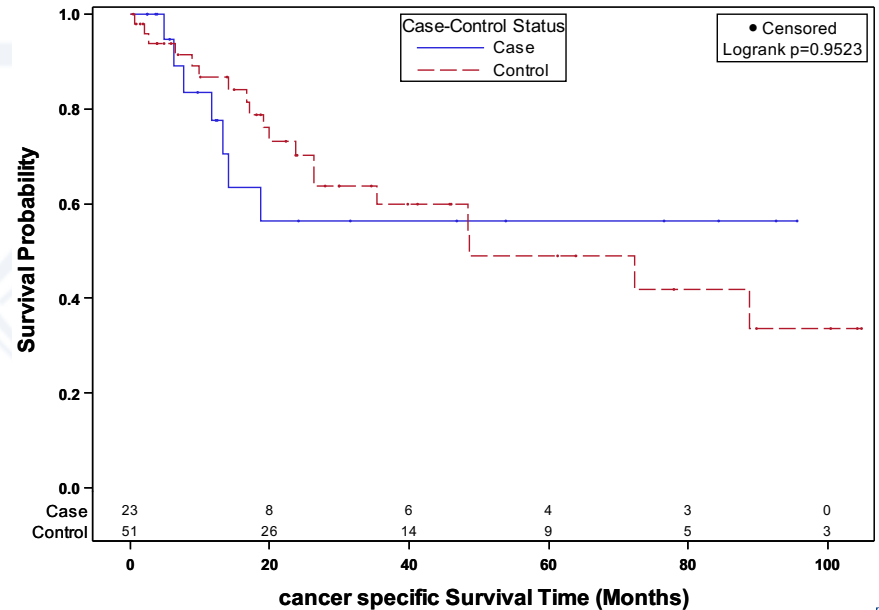


Survival

Overall Survival



Cancer-Specific Survival

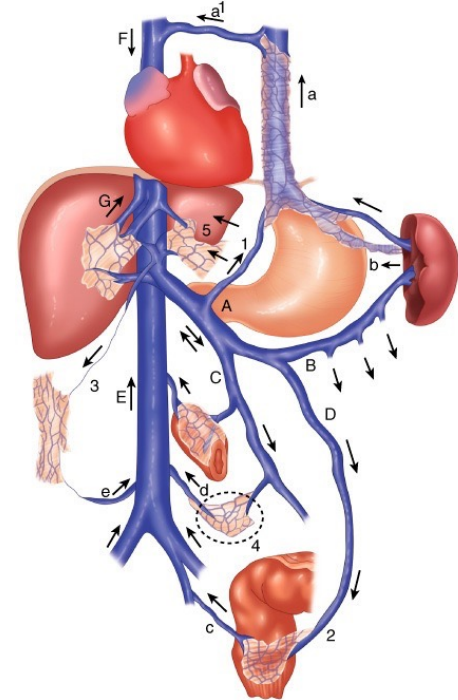


ECOG Status: Only significant predictor of mortality

Patient Examples



Pictures shown with written permission.



Source: Brunicaudi FC, Andersen DK, Billiar TR, Dunn DL, Hunter JG, Matthews JB, Pollock RE: *Schwartz's Principles of Surgery, 9th Edition*; <http://www.accessmedicine.com>. Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

Conclusions

- Compared to thrombectomy patients, ligation patients initially face more challenging postoperative course
- Ligation and thrombectomy patients do similarly **long-term** in regards to:
 - eGFR
 - Complication Rate
 - Overall and Cancer-Specific Survival