Exploring the prognostic value of systemic immune-inflammation index in patients with locally advanced pancreatic cancer treated with irreversible electroporation.

Azzam Malkawi (aamalk01@louisville.edu), Dr. Robert Martin M.D. PhD
Department of Surgical Oncology, Louisville, KY.

Introduction

Locally advanced pancreatic cancer (LAPC) is a challenging disease to treat. Irreversible electroporation (IRE), a non-thermal local ablative modality has demonstrated improvements in the treatment of LAPC, with at least one ongoing randomized controlled trial designed to address its role compared to systemic chemotherapy alone.

Systemic-immune-inflammation index (SII) is a prognostic marker in various cancers and can be easily calculated using routine lab values.
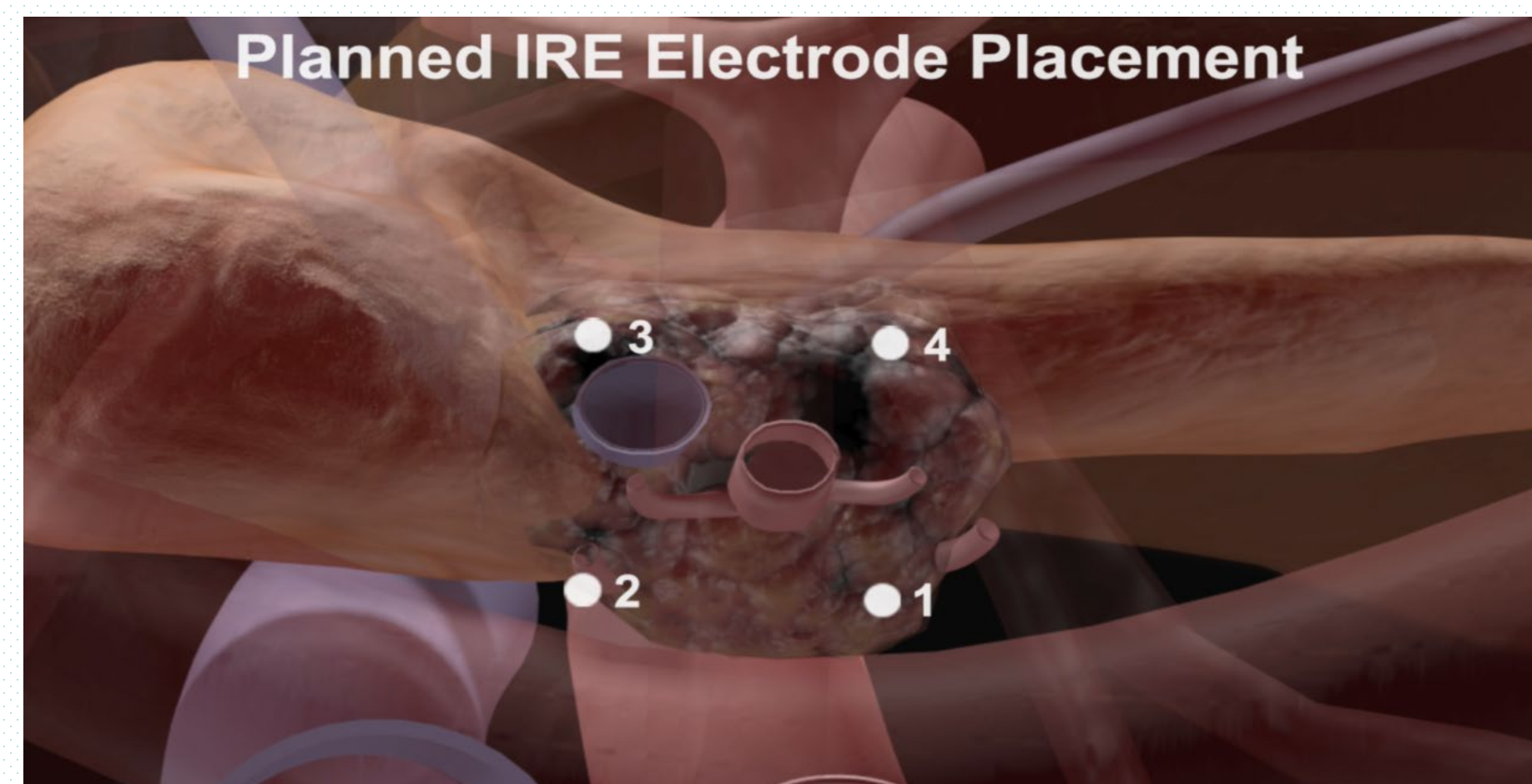

Figure 1, Placement of electrodes in IRE treatment.

Hypothesis/Objective

The aim of this study is to explore the relationship between SII and prognosis in patients with LAPC treated with IRE.

Methods

A review of our prospective national database of patients with LAPC treated with IRE was preformed from 1/2015 to 5/2021. SII is based on platelet (P), neutrophil (N), and lymphocyte (L) counts and is calculated as $SII = P \times N/L$. The rates of OS and PFS were estimated by Kaplan-Meier method. Two cutoff values for SII were selected based off consensus of literature: >800 and >1200. Multivariable Cox survival regression was performed to determine independent predictors of PFS and OS.

Results

A total of 97 LAPC patients were included in this study (median age 68 years, range 42 – 93). The following comparisons are between the >800 SII group (N = 36) and the <800 SII group (N = 61):

The mean disease-free interval (DFI) was 20.9 ± 15.9 months compared to 20.7 ± 12.3 months (p=0.948). The mean hospital stay was 9.5 ± 4.6 days compared to 8.1 ± 3.8 days (p=0.128). The number of complications per patient was 2.0 ± 1.5 complications compared to 1.7 ± 0.9 complications (p=0.281). The following comparisons are between the >1200 SII group (N = 17) and the <1200 SII group (N = 81): The mean disease-free interval (DFI) was 17.8 ± 7.5 months compared to 21.1 ± 13.9 months (p=0.174). The mean hospital stay was 9.2 ± 4.8 days compared to 8.5 ± 4.0 days (p=0.580). The number of complications per patient was 2.2 ± 1.8 complications compared to 1.7 ± 0.9 complications (p=0.279).

Table 1, Patient demographic and clinicopathologic characteristics utilizing the 800 SII cutoff.

Variable	Post-treatment SII > 800 (n=36)	Post-treatment SII ≤ 800 (n=61)	P-value
Mean Age (years)	67.17 ± 9.4	66.62 ± 9.0	0.776
Mean Highest Grade of Adverse Event	3.10 ± 0.9	2.92 ± 1.1	0.408
Mean CA 19-9 Change	837.95 ± 3440.3	599.84 ± 1229.0	0.624
Mean Disease Free Interval (months)	20.88 ± 15.9	20.66 ± 12.1	0.939
Prior CABG, PTC, or Cardiac Stent	7	8	
Prior Carotid Endarcetormy or Stenting	1	1	
Prior COPD or Severe Asthma	2	4	
Diabetes	10	12	
Type I	0	0	
Type II Insulin-Dependent	2	5	
Type II Non-Insulin Dependent	8	6	
Alcohol Abuse	3	3	
Tobacco History	11	6	
Mean Packs per Year	168.00 ± 174.1	271.00 ± 137.9	0.002
Hypertension	15	26	
Pancreatitis	3	4	
Cholecystectomy	8	15	
Tumor Location:			
Head	20	41	
Body/Neck	17	21	
Tail	0	1	
Mean Tumor Diameter (centimeters):			
Axial	3.02 ± 0.9	2.67 ± 0.8	0.049
Anterior/Posterior	2.44 ± 0.8	2.23 ± 0.5	0.115
Cranial/Caudal	2.71 ± 0.6	2.61 ± 0.6	0.430
Mean Karnofsky Score	92.5 ± 17.6	96.72 ± 13.2	0.183
Mean ECOG Score	0.33 ± 0.5	0.10 ± 0.3	0.005
Mean Total Length of Hospital Stay (days)	9.47 ± 4.6	8.08 ± 3.8	0.111
Mean Total Number of Complications	2.00 ± 1.5	1.65 ± 0.9	0.154

Table 2, Patient demographic and clinicopathologic characteristics utilizing the 1200 SII cutoff.

Variable	Post-treatment SII > 1200 (n= 17)	Post-treatment SII ≤ 1200 (n=80)	P-value
Mean Age (years)	66.76 ± 9.2	66.84 ± 9.2	0.974
Mean Highest Grade of Adverse Event	3.00 ± 0.6	3 ± 1.1	1.000
Mean CA 19-9 Change	265.49 ± 514.1	778.03 ± 2511.3	0.406
Mean Disease Free Interval (months)	17.83 ± 7.5	21.18 ± 13.9	0.339
Prior CABG, PTC, or Cardiac Stent	5	10	
Prior Carotid Endarectormy or Stenting	0	2	
Prior COPD or Severe Asthma	2	4	
Diabetes	6	16	
Type I	2	1	
Type II Insulin-Dependent	1	6	
Type II Non-Insulin Dependent	3	9	
Alcohol Abuse	3	3	
Tobacco History	6	11	
Mean Packs per Year	183.75 ± 176.1	213.20 ± 169.1	0.519
Hypertension	11	30	
Pancreatitis	2	5	
Cholecystectomy	4	19	
Tumor Location:			
Head	10	51	
Body/Neck	8	30	
Tail	0	1	
Mean Tumor Diameter (centimeters)			
Axial	3.05 ± 0.8	2.75 ± 0.8	0.164
Anterior/Posterior	2.31 ± 0.6	2.31 ± 0.7	1.000
Cranial/Caudal	2.75 ± 0.6	2.63 ± 0.6	0.456
Mean Karnofsky Score	89.41 ± 24.1	96.38 ± 12.2	0.083
Mean ECOG Score	0.41 ± 0.5	0.14 ± 0.3	0.004
Mean Total Length of Hospital Stay (days)	9.23 ± 4.8	8.46 ± 4.0	0.488
Mean Total Number of Complications	2.18 ± 1.8	1.69 ± 0.9	0.100

Conclusions

A high SII value, defined as above the 800 and 1200 cutoffs, does not suggest a significant difference in DFI, length of hospital stay or number of post-surgical complications.

References/Acknowledgements

1. Jomrich G, Gruber ES, Winkler D, Hollenstein M, Gnant M, Sahora K, et al. Systemic Immune-Inflammation Index (SII) Predicts Poor Survival in Pancreatic Cancer Patients Undergoing Resection. J Gastrointest Surg. 2020;24(3):610-8.