



PREDICTING GENICULAR COOLED-RADIOFREQUENCY ABLATION PROCEDURAL EFFICACY UTILIZING THE KNEE INJURY AND OSTEOARTHRITIS OUTCOME SCORE

Alejandro Carruyo¹, Padma Gulur², Amanda Nelli², Robert Ackerman³, Muhammad Anwar², Peter Yi².

¹Duke University School of Medicine, ²Pain Medicine Division, Duke Department of Anesthesiology, ³Division of Interventional Pain Medicine, Moffit Cancer Center

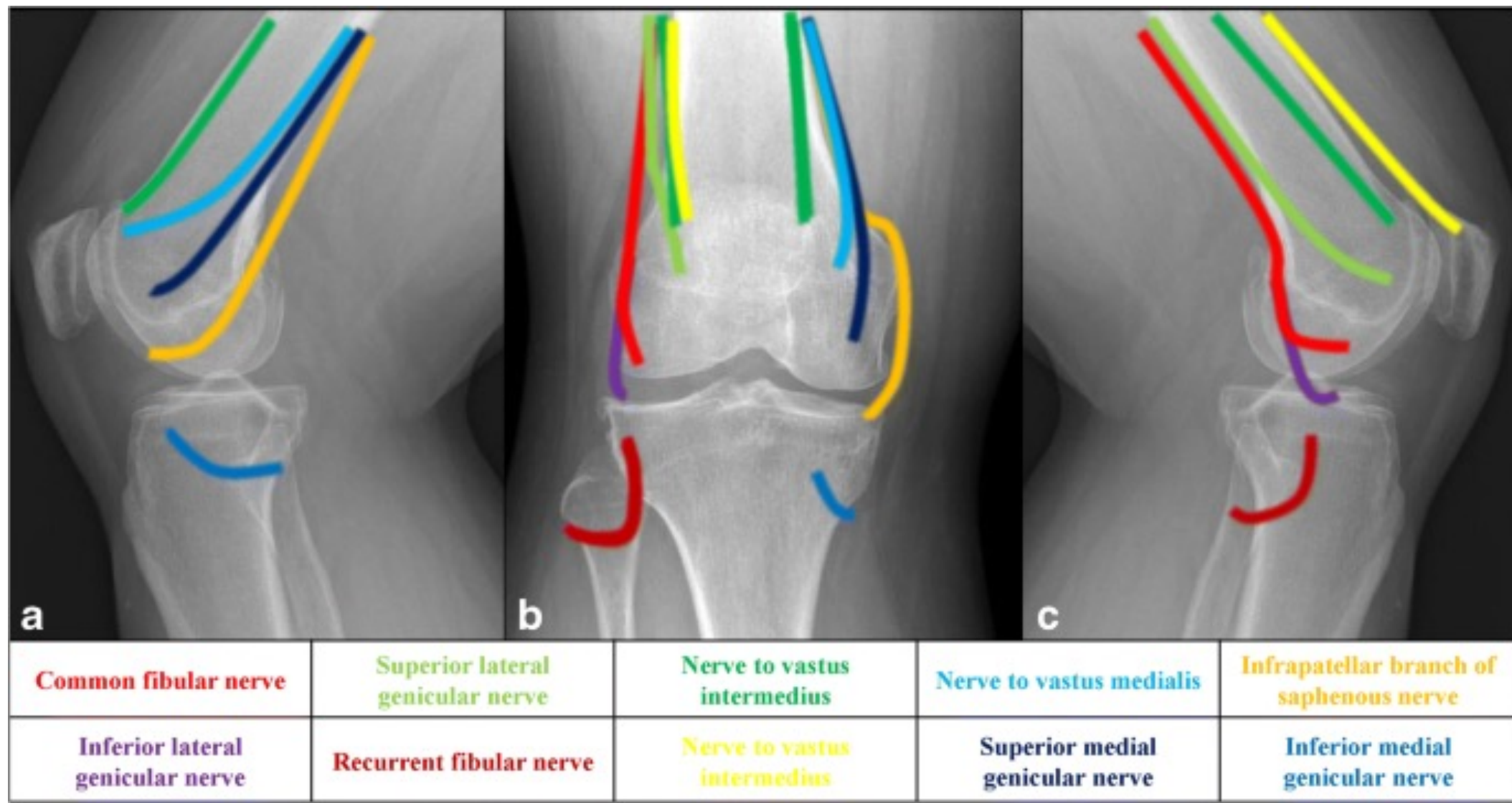
INTRODUCTION

Radiofrequency ablation (RFA) of genicular nerves is a relatively new treatment modality developed for patients that have failed conservative treatments and are poor surgical candidates. Emerging literature has highlighted cooled-RFA (cRFA) as an efficacious treatment modality for knee OA due to relative ease of use, safety, and efficacy. However, there continues to be a paucity of evidence on easy-to-administer predictive tools that could result in superior treatment outcomes. Our study evaluates the baseline (KOOS) function (activities) domain as a potential predictor of successful outcomes after cooled GNRFA.

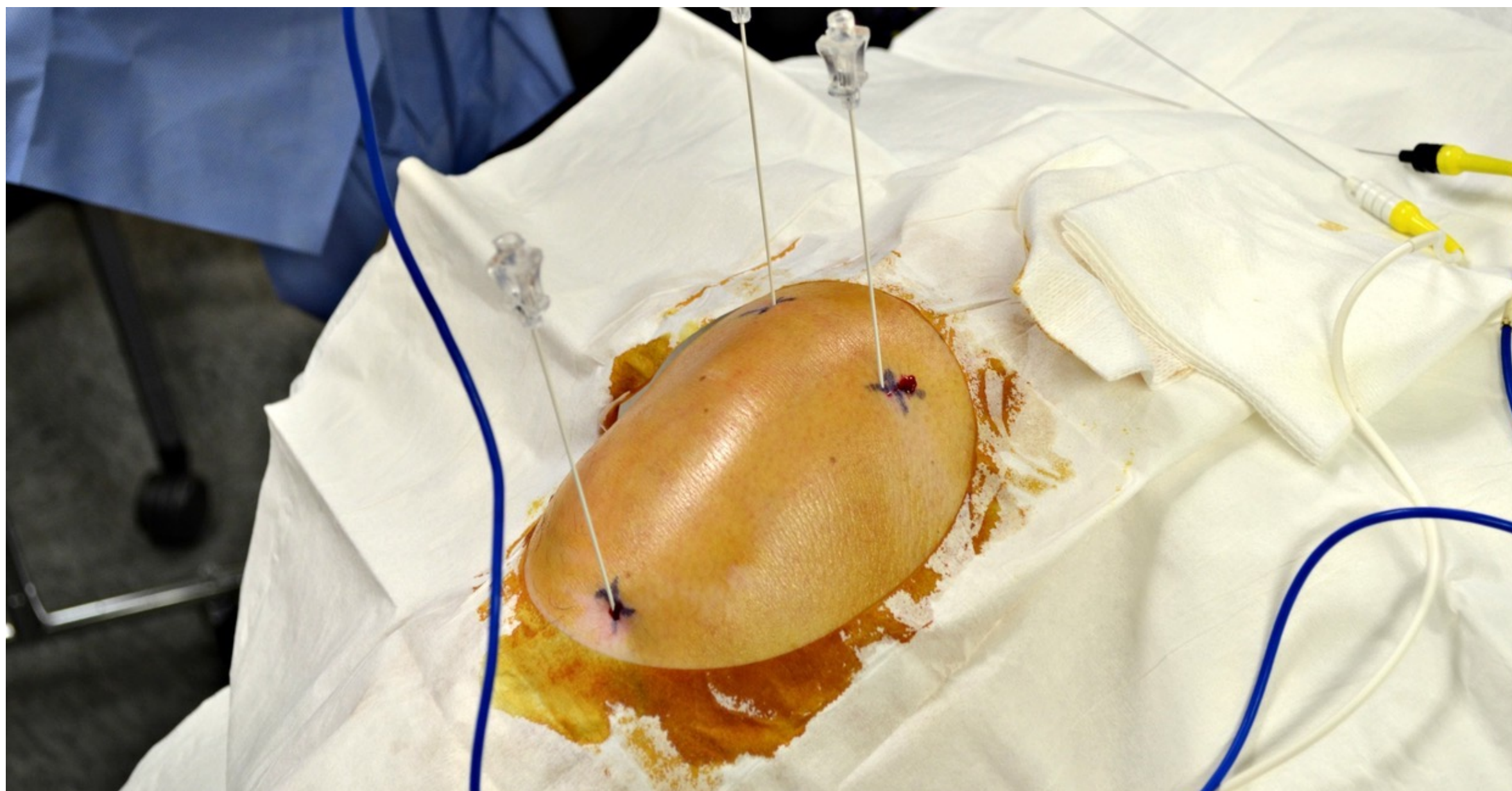
METHODS

This is a preliminary analysis of IRB-approved study analyzing patients with chronic knee OA (≥6 months) unresponsive to conservative treatments. A total of 18 patients were recruited and underwent cRFA, while 4 patients were excluded due to lacking interval data, and a history of prior TKA or RFA on the same knee. KOOS questionnaire was gathered at the initial encounter before cRFA and after a month while assessment of subjective treatment effect was recorded. The primary outcome was binary (yes/no) improvement into four or more KOOS domains including, symptoms, pain, function (daily living), function (activities), and quality of life. Subgroup analysis on patients with baseline KOOS function (activities) < or > 15 was performed due to small variance and large mean difference between patients that met primary outcome.

RESULTS



Baseline Differences Between Subgroups			
	< 15	> 15	p-value
Number (n)	8	6	NA
Age			
Mean	61.63	69.33	NS
Variance	95.70	130.27	
OME			
Mean	8.57	32.50	NS
Variance	139.29	#####	
% Relief from DB			
Mean	91.25	80.50	NS
Variance	326.79	941.50	
KOOS Overall Scr			
Mean	24.11	44.47	0.0013
Variance	90.12	100.16	
KOOS Symptoms Scr			
Mean	33.04	44.35	0.0337
Variance	108.42	105.12	
KOOS Pain Scr			
Mean	32.99	51.39	0.0055
Variance	153.08	110.34	
KOOS Function, Daily Scr			
Mean	37.51	62.25	0.0031
Variance	304.04	107.84	
KOOS Function, Act Scr			
Mean	3.75	30.00	0.0004
Variance	19.64	100.00	
KOOS Quality of Life Scr			
Mean	13.28	44.47	0.0003
Variance	216.94	100.16	



Comparison in Efficacy between Subgroups						
< 15			> 15			
			Baseline	1-Month	p-value	
KOOS Overall Scr			Baseline	1-Month	p-value	
Mean	24.1	38.5	0.007	44.47	46.41	NS
Variance	90.1	323.9		100.16	309.24	
KOOS Symptoms Scr			Baseline	1-Month	p-value	
Mean	33.0	44.6	0.0495	44.35	49.90	NS
Variance	108.4	306.1		105.12	255.16	
KOOS Pain Scr			Baseline	1-Month	p-value	
Mean	33.0	51.0	0.0133	51.39	57.87	NS
Variance	153.1	436.4		110.34	260.55	
KOOS Function, Daily Scr			Baseline	1-Month	p-value	
Mean	37.5	52.9	0.0196	62.25	61.90	NS
Variance	304.0	656.8		107.84	314.78	
KOOS function, Sports Scr			Baseline	1-Month	p-value	
Mean	3.8	15.0	0.021	30.00	32.50	NS
Variance	19.6	257.1		100.00	1257.50	
KOOS Quality of Life Scr			Baseline	1-Month	p-value	
Mean	13.3	28.9	0.003	34.38	29.86	NS
Variance	216.9	389.9		292.97	173.03	

CONCLUSIONS

- Baseline KOOS Function (Activities) score of <15 showcased predictive value for overall KOOS score improvement after cRFA of the genicular nerves.
- Although more evidence is needed, our results highlight patients with lower KOOS scores as most likely to benefit from cRFA as determined by their 1-month KOOS reevaluation.

FUTURE DIRECTIONS

While initial data analysis showcases promise for the use of KOOS subscores as predictive tools, we recognize that larger studies must be conducted. This work represent an interim analysis of our ongoing longitudinal study evaluating patients at 1-, 3-, 6-, and 12-months intervals.

ACKNOWLEDGEMENTS

This work was made possible only with the guidance and assistance of several collaborators and organizations, including but not limited to the Duke Pain Clinic, Duke Anesthesiology Department, Dr. Padma Gulur, Dr. Amanda Nelli, and Dr. Peter Yi. Thank you!

REFERENCES

- Kapural L, Deering JP. A technological overview of cooled radiofrequency ablation and its effectiveness in the management of chronic knee pain. *Pain Management*. 2020;10(3):133-140.
- Gupta A, Huettner DP, Dukewich M. Comparative Effectiveness Review of Cooled Versus Pulsed Radiofrequency Ablation for the Treatment of Knee Osteoarthritis: A Systematic Review. *Pain Physician*. 2017;20(3):155-171.
- Lyman J, Khalouf F, Zora K, et al. Cooled radiofrequency ablation of genicular nerves provides 24-Month durability in the management of osteoarthritic knee pain: Outcomes from a prospective, multicenter, randomized trial. *Pain Pract*. 2022;22(6):571-581.
- Wu L, Li Y, Si H, et al. Radiofrequency Ablation in Cooled Monopolar or Conventional Bipolar Modality Yields More Beneficial Short-Term Clinical Outcomes Versus Other Treatments for Knee Osteoarthritis: A Systematic Review and Network Meta-Analysis of Randomized Controlled Trials. *Arthroscopy*. 2022;38(7):2287-2302.