

CONTACT FORCE-GUIDED MAPPING AND ABLATION FOR IMPROVED DIAGNOSIS AND TREATMENT OF SUSTAINED ATRIAL TACHYCARDIA

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Introduction

- Treatment of atrial tachycardia by three-dimensional electro-anatomical mapping (3D EAM) and radiofrequency catheter ablation (RFCA) has been described using a non-contact force system, but recurrence was still seen in some patients.¹ This could be caused by inadequate catheter-tissue contact during RFCA, resulting in incomplete ablation lesions.
- Real-time assessment of the contact force (CF) between catheter and tissue might improve procedural success and decrease arrhythmia recurrence rate.**

Methods

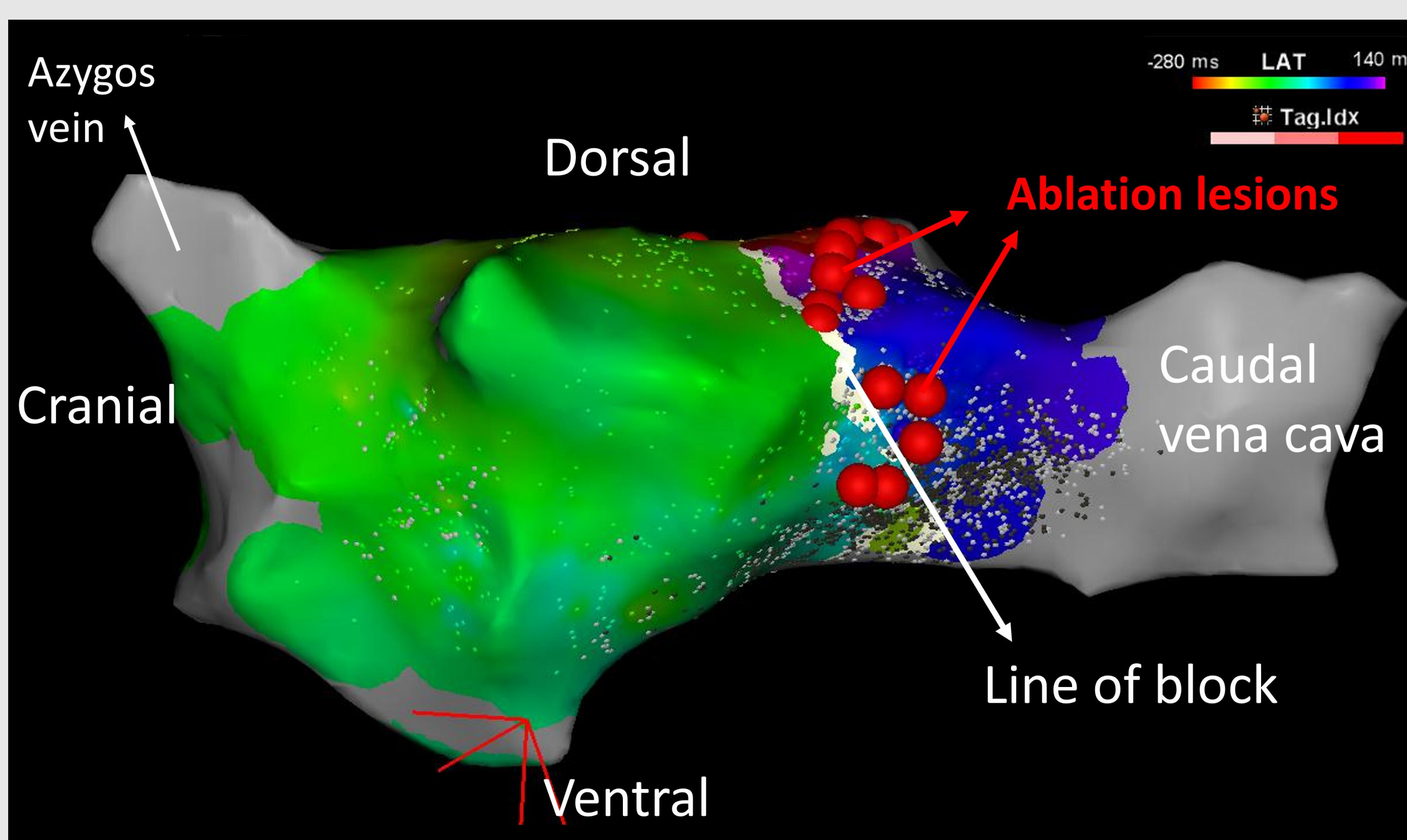
- Nine horses with sustained atrial tachycardia
- 3D EAM of the right atrium using CARTO®3
- Point-by-point ablation
 - CF-guided
 - Power-controlled mode
 - Irrigation rate 30 ml/min
 - Target power: 35 W
 - Ablation index: 450



ECG of sustained atrial tachycardia, characterized by rapid, monomorphic P' waves, normal QRS morphology but irregular RR intervals.

Results

- 3D EAM revealed the origin of atrial tachycardia in the **caudomedial aspect of the right atrium** (n=9).
- Point-by-point ablation successfully **closed the isthmus** of the reentry circuit.



Left lateral view on an activation map of the right atrium. A counterclockwise reentry circuit in the caudomedial aspect of the right atrium circles around a line of conduction block (white line). Point-by-point ablation (red dots) at the dorsal and ventral isthmus of the reentry was performed which restored sinus rhythm and altered the reentry circuit to minimize recurrence risk.

3D EAM of the right atrium	
Mean mapping time	50 ± 27 min
Type of atrial tachycardia	Clockwise macro-reentry (n=7) Counterclockwise macro-reentry (n=2)

Radiofrequency catheter ablation	
Mean RF applications	18 ± 8
Mean ablation time	41 ± 16 min

Radiofrequency applications (n=156)	
Median power	35 [IQR 5] W
Median duration	19 [IQR 7] s
Median contact force	11 [IQR 8] g
Median ablation index	439 [IQR 47]

Outcome	
Sinus rhythm was restored in all nine horses	
None of the horses have shown recurrence so far (7-28 months post ablation)	

Conclusion

CF-guided RFCA with the CARTO®3 system was feasible and effective to permanently treat the cause of sustained atrial tachycardia in horses. CF monitoring ensured efficient lesion creation, thereby minimizing the risk of recurrence.

Clinical relevance: Compared to atrial fibrillation, treatment of atrial tachycardia using quinidine sulphate or transvenous electrical cardioversion can be more difficult, with a higher recurrence rate. 3D EAM and RFCA using real-time CF measurement not only restores normal sinus rhythm, but also minimizes the risk for recurrence of atrial tachycardia by changing the arrhythmogenic substrate.

1: Van Steenkiste G, Boussy T, Duytschaever M, et al. Detection of the origin of atrial tachycardia by 3D electro-anatomical mapping and treatment by radiofrequency catheter ablation in horses. J Vet Intern Med. 2022;1481-1490.