

عنوان مقاله:

A Semi-Automated Algorithm for Segmentation of the Left Atrial Appendage Landing Zone: Application in Left Atrial Appendage Occlusion Procedures

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خلاصه مقاله:

Background: Mechanical occlusion of the Left atrial appendage (LAA) using a purpose-built device has emerged as an effective prophylactic treatment in patients with atrial fibrillation at risk of stroke and a contraindication for anticoagulation. A crucial step in procedural planning is the choice of the device size. This is currently based on the manual analysis of the "Device Landing Zone" from echocardiographic images. Objective: We aimed to develop an algorithm for automated segmentation of the LAA landing zone from 3D echocardiographic images of the LAA. Material and Methods: In this experimental study, 2D axial images were derived from the 3D echo datasets. After image pre-processing, binary images were created using a thresholding method. A binary image matrix was then formed and scanned using λ -adgacency approach resulting in segmentation of the objects with a closed circumference within the image. Erosion/dilation techniques were then applied to remove small objects. A feature-based approach was then used to firstly detect the LAA region and secondly to identify the device landing zone. Results: A total of 22 datasets were used in this study. The algorithm produced up to 9 axial images as the proposed landing zone. The selected axial images were compared to the echocardiographic images. In 18 cases (81.8%), the algorithm successfully segmented the LAA and proposed the landing zone based on the defined features. Conclusion: We have developed a simple and fast algorithm for semi-automated segmentation of the LAA landing zone. Further studies are needed to assess the accuracy of the proposed landing zones by this method.

کلمات کلیدی:

Atrial Appendage, Atrial Fibrillation, Imaging, Three-Dimensional

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