

Letter to the Editor

The art of color coding for three dimensional diagnostic mapping of unusual cardiothoracic vascular abnormalities[☆]Farhood Saremi^{*}, Anoushiravan Hakim, Arvin Saremi, Chester Bai*Image Processing Laboratory, Department of Radiology, University of Southern California, Los Angeles, CA, United States*

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While progressive advances in CT technology have helped to improve the quality of post processing techniques, the diagnosis of complex cardiovascular diseases and malformations can be difficult and final correct interpretation still relies on many other factors. Even with new post processing techniques it could be difficult to describe the abnormalities in an easy and understandable manner. Reports can be long and misunderstanding may arise with the findings described in radiology reports. In our daily practice, we found color mapping using advanced post processing techniques very helpful in order to reach a precise conclusion and communicate more efficiently with the referring physicians.

Dedicated software to improve visualization of vascular structures in volume rendered (VR) reconstructions is now available. Vessel segmentation algorithms are the key components of post processing in radiology workstations [1,2]. However, there is no single segmentation method that can extract all vessels seen on two dimensional images. Some methods employ pure intensity based pattern recognition techniques such as thresholding and some other methods apply explicit vessel models to extract the vessel contours. Both region growing software and centerline extraction techniques may have limitation in low contrast and noisy images for automated segmentations. Combining these methods with manual tracing can help to map most of the vascular structures if done properly. In this review, we present some examples of segmentation and color coding of CT images of complex cardiothoracic vascular abnormalities which facilitated image interpretation of these cases (Figs. 1–6).

References

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[☆] The author(s) of this manuscript have certified that they comply with the Principles of Ethical Publishing in the International Journal of Cardiology.

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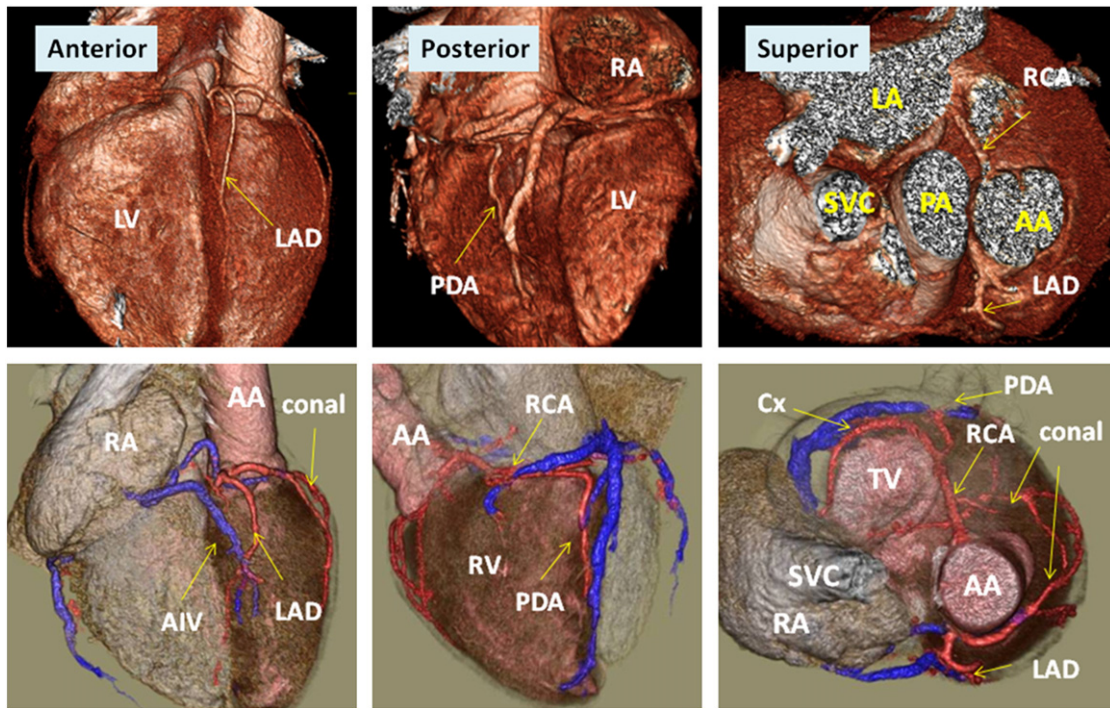


Fig. 1. Volume rendered CT images before (upper row) and after color coding (lower row) in a patient with congenitally corrected transposition of the great arteries. Improved visualization of the complex vascular anatomy is shown after color coding. Note anomalous drainage of the anterior interventricular vein (AIV) into the right atrium (RA) and posterior course of the right coronary artery (RCA) dividing into the posterior descending artery (PDA) and circumflex artery (Cx). There is no circumflex artery arising from the left main or left anterior descending artery (LAD). AA = ascending aorta, LA = left atrium, PA = pulmonary artery, TV = tricuspid valve, RV = morphological right ventricle, LV = morphological left ventricle, SVC = superior vena cava.

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