CARDIOVASCULAR FLASHLIGHT
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Automated anatomical intelligence: next-generation fusion imaging during structural heart interventions

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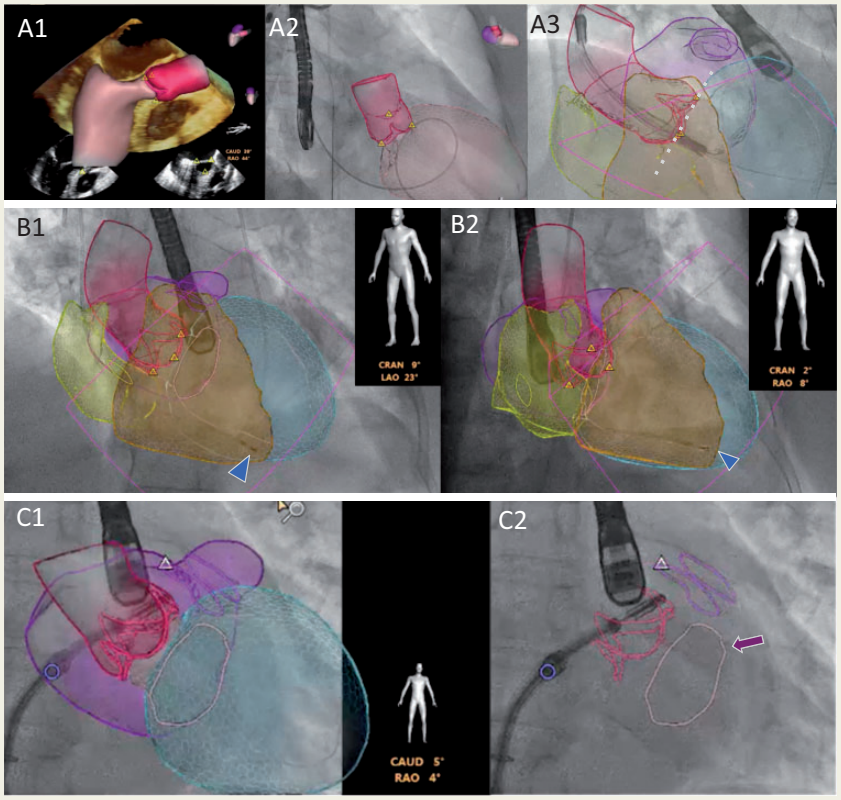

Heart teams performing structural heart interventions face particular imaging difficulties, including separate image orientation and different tissue imaging abilities of the involved techniques. Specialized software (EchoNavigator, Philips Healthcare, Best, The Netherlands) enables fusion of three-dimensional transoesophageal echocardiography and fluoroscopy to overcome such shortcomings. However, visualization of complex anatomical structures and interventional precision within the beating heart remain challenging.

Novel EchoNavigator software (investigational device) with anatomical intelligence auto-generates a heart model with delineation of critical anatomical landmarks [*PanelA1*; left ventricle and aortic root model with nadirs of aortic valve cusps (yellow triangles)]. Co-registration with the C-arm and the use of electrocardiogram gating allows live overlay of the model during fluoroscopy (*PanelA2*, Supplementary material online, Video S1). During transcatheter aortic valve implantation, model overlay can be used for optimal annular plane orientation before prosthesis implant without the use of contrast agent (dotted line on nadirs in *PanelA3*, Supplementary material online, Video S2) or for correct positioning of a temporary pacemaker lead (arrow head in *PanelsB1* and *B2* and Supplementary material online, Video S3, displaying the heart at different angulations). During the MitraClip procedure (Supplementary material online, Video S4), the overlay of the heart model (*PanelC1*) and the auto-generated anatomical landmarks such as the orifice of the left upper pulmonary vein (white triangle), the orifice of left atrial appendage (purple circle) as well as the mitral annulus (arrow, *PanelC2*) ensure precise and safe catheter passage through the delicate left atrium. Advanced imaging technologies thus may play an important rule to increase the efficacy and safety of structural heart interventions.

Supplementary material is available at *European Heart Journal* online.