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**Assessing of vascular Rings, slings and their potentially life-threatening complications using MRI, CT, and Tracheobronchoscopy from newborns to seniors**

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**OBJECTIVE:** Vascular rings and slings (R+S) are rare congenital cardiovascular malformations, but frequently cause tracheomalacia, which in turn is of prognostic relevance. Aim of this study was to explore the diagnostic accuracy of MRI and CT-angiography for the assessment of cardiovascular malformation, tracheal pathology, and their topographic relationship.

**METHOD:** In the last 10 years 106 patients (median [range] 1.5 y [1 week to 56y]) got further examination by MRI (n=76) or CT (30; only the smallest and critical ill patients) due to suspected R+S. The extension and the type of R+S as well as their relationship to esophagus, trachea or bronchi was assessed and correlated to conventional catheterization (if available due to associated heart defects; n=10), tracheobronchoscopy and intraoperative findings (if R+S was confirmed by MRI or CT).

**RESULTS:** In 61 out of 104 patients, R+S was found (double aortic arch (AoA), n=14; right AoA+aberrant left subclavian artery+left ligament arteriosus, 30; pulmonary sling, 6; others, 11). In all patients, MRI / CT confirmed the topographic relation of R+S to trachea corresponding to bronchoscopic and intraoperative findings. Although MRI and CT had a weakness in detecting atretic segments and ligaments directly, there was no false positive case. CT had a better spatial resolution (0.5 mm) and air/soft-tissue contrast, therefore virtual bronchoscopies were possible.

**CONCLUSIONS:** MRI and CT allow a non-invasive assessment of rings and slings including potentially tracheal, bronchial or esophageal compression even in the smallest patients. Furthermore, 3D post-processing improves the preoperative planning. MRI and CT may be considered the first-line imaging modalities in these patients.