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| **Supplemental Table 2. Work-Up, Management, and Outcome of Patients with Rosai-Dorfman Disease-Related Cardiac Disease.** | | | | | |
| **Study (Year)** | **Signs and Symptoms at Presentation** | **Relevant Cardiac Workup and Findings** | **Type of Cardiac Involvement; Size\*** | **Treatment** | **Outcome** |
| Butt, 2023 | Chest tightness, dyspnea, dizziness | CXR 🡪 normal  EKG 🡪 3rd degree AVB  cMRI 🡪 irregular hyperintense IAS mass on T1/T2 with heterogenous enhancement compared to surrounding myocardium  TEE🡪 infiltrative IAS mass  Myocardial biopsy 🡪 diagnosed RDD | IAS (extending into the IVS, CS and AV annulus); 3.7 cm | Permanent pacemaker placement as mass was deemed unresectable; patient denied steroids | 10-month follow up without worsening of symptoms |
| Gill, 2023\* | Chest tightness, edema, presyncope | EKG 🡪 3rd degree AVB with narrow complex escape  TTE/TEE/chest CT/cMRI 🡪 large interatrial mass  Myocardial biopsy 🡪 diagnosed RDD | IAS (extending to the aortic root) | Steroids, permanent pacemaker placement | Not reported |
| Hritani, 2023 | Incidental finding during pneumonia work-up | Chest CT 🡪 LA opacification  EKG 🡪 non-specific T-wave abnormalities  TTE 🡪 adherent LA mass  Chest CT/PET-CT 🡪 avid uptake in the LA mass with scattered reactive lymph nodes | LA (involving the anterior MV and distal IAS); 2.2 cm | Surgical resection 🡪 diagnosed RDD | 1-month follow up with no recurrence |
| Yoshida, 2023 | Dyspnea, edema, skin erythema, cheek nodule | Skin biopsy 🡪 histiocytic infiltration of unknown etiology  CXR 🡪 cardiomegaly  Echocardiograph 🡪 hyperechoic IAS thickening, irregular thickening with heterogenous echoic brightness in the LA wall  PET-CT 🡪uptake of peri-atrial lesion  cMRI 🡪 homogeneously enhanced nodule in the arterial phase  Skin biopsy 🡪 diagnosed RDD | IAS (extending to LA) | Prednisolone, electrical cardioversion | 6-month follow up PET-CT showed reduced uptake in all involved areas. |
| Yadiv, 2023\* | Right testicular edema and arrhythmia | EKG 🡪 3rd degree AVB  TTE 🡪 EF of 20%, exophytic mass protruding from the anterior apical septum  cMRI 🡪 septal thickening with heterogenous contrast enhancement | IVS (protruding into the RV) | Steroids, temporary pacing | Died from ventricular arrythmia |
| Conte, 2021 | Dyspnea, pulsus paradoxus | TTE 🡪 echodense RA mass  cMRI 🡪 severe pericardial effusion, three solid RA masses with smooth borders, atrial wall infiltration, heterogenous hyperintense T2 signal  PET-CT 🡪 negative for malignancy  Pericardiocentesis 🡪 diagnosed RDD | Pericardium, RA (extending into the IAS, right AV junction, and SVC); 1.9 cm | NSAIDS, colchicine, steroids, and anti-IL1 followed by pericardiectomy and RA debulking 2 months later (complete resection not feasible) | 2-year follow up with resolution of pericardial effusion and progressive worsening of mitral and aortic regurgitation to moderate-severe |
| Liang, 2021 | Dyspnea | Imaging (unspecified) 🡪 infiltrative pericardiac mass  Pericardial biopsy and next-generation sequencing 🡪 diagnosed RDD | Pericardium | Not reported | Not reported |
| Maronese, 2021\* | Papular skin eruptions, polyarthritis, pleural/pericardial effusions | PET-CT 🡪 RA and left femoral bone hypercapitation  Skin biopsy 🡪 diagnosed RDD | RA | Pericardiocentesis/surgical debulking 🡪 Diagnosed RDD  Anti-TNF | 2-year follow up without recurrence and improvement of symptoms |
| Tınazlı, 2020 | Parotid and submandibular edema | Neck MRI 🡪 bilateral cervical, parotid, and submandibular lymphadenopathy  cMRI 🡪 uniform mass that is adherent to the IVS, with hyperintense appearance on T2 images compared to surrounding myocardium, and homogenous enhancement with contrast  Lymph node biopsy 🡪 diagnosed RDD | IVS (protrudes into the RV); 1.5 cm | Cosmetic resection of facial lesions; no other interventions | 2-year follow up without interval increase in the size of intracardiac mass |
| Hou, 2020 | Dyspnea | TTE 🡪 pericardial effusion and solid RA mass  Chest CT/PET-CT 🡪 avid uptake in the RA | RA, pericardium | Surgical resection 🡪 diagnosed RDD | Not reported |
| Kondo, 2020 | Loss of appetite, orthopnea, red skin lesions, bilateral eye inflammation | Skin biopsy 🡪 diagnosed RDD | Pericardium | Symptomatic treatment with steroid eye drops and ointment  Autopsy 🡪 diagnosed RDD-related fibrinous pericarditis | Died 3 year after symptom onset (autopsy attributed mortality to RDD-related congestive heart failure) |
| González-Pacheco, 2020 | Palpitations, chest pain, dizziness, electrical storm, sustained atrial/ventricular tachycardia | EKG 🡪 normal  TTE 🡪 solid masses in the RA and LV  Chest CT/PET-CT 🡪 intense uptake in the RA and LV  Attributed to Hx of RDD | RA, LV | Dexamethasone and chemotherapy | Not reported |
| Wang, 2020 | Chest pain | EKG 🡪 sinus tachycardia, premature atrial complexes  CXR 🡪 normal  Chest CT angiography 🡪 soft tissue mass extending from the RVOT  TTE 🡪 did not identify the mass  TEE 🡪 mass extending from the RVOT into the main pulmonary artery  cMRI 🡪 irregularly shaped mass with isointense signal, delayed and heterogenous contrast uptake | RV (extending to the RVOT and main PA); 4.4 cm | Surgical resection 🡪 Diagnosed RDD | Not reported |
| Desai, 2019 | Dyspnea, jugular venous distension | Echocardiogram 🡪 thickening of RV free wall and constrictive pericarditis  Chest CT 🡪 mass-like density of the anterior pericardium  Open surgical biopsy 🡪 inconclusive  PET-CT 🡪 avid pericardiac mass uptake  CT-guided needle pericardial biopsy 🡪 diagnosed RDD | Pericardium (overlying the RV, RCA, ascending aorta, and aortic arch) | Prednisone | 1-year follow-up with resolution of constrictive pericarditis |
| Khan, 2019\* | Not reported | Not reported | RA | Surgical resection 🡪 diagnosed RDD and concurrent IgG4-related disease | Not reported |
| Tarkin, 2019 | Dyspnea | CXR 🡪 large pericardial effusion  TTE 🡪 cardiac tamponade  PET-CT 🡪 uptake in the heart, particularly RA  cMRI 🡪 epicardial mass with high intensity T1 images and enhancement following contrast  Pericardial biopsy 🡪 diagnosed RDD | Epicardium (encasing RCA and SVC) | Not reported | Not reported |
| Tsigaridas, 2019 | Incidental during workup for NSTEMI | TTE/TEE 🡪 Mass encircling the RA cavity without obstruction of the SVC, CS, or RCA orifice | RA (extending into the IAS, surrounding ostia of SVC and CS); 4.5 cm | Conservative management (unspecified) | Not reported |
| Tyebally, 2019\* | Chest pain | EKG 🡪 normal  CXR 🡪 obscuration of the right heart border  Chest CT/echocardiogram 🡪 lobulated lesion arising within the pericardium, adjacent to the RA  PET-CT 🡪 intense uptake of RA mass, with low T1 signals, and contrast enhancement in the early and late phase | RA; 2.9 cm | Surgical excision 🡪 diagnosed RDD | Follow up (unspecified interval) without recurrence |
| Yaman, 2019 | Bilateral parotid swelling, | Excisional biopsy of parotid gland 🡪 diagnosed RDD  EKG 🡪 normal  Echocardiogram/cMRI 🡪 RV mass | RV (extends into the IVS); 1.5 cm | Patient denied surgical treatment. | 1-year follow up without interval increase in the size of intracardiac mass. |
| Gosh, 2018 | Dyspnea, generalized lymphadenopathy | EKG 🡪 normal  CXR 🡪 cardiomegaly  TTE/TEE 🡪 homogonous mass-like structures attached to the RV free wall, RA, and tricuspid valve  cMRI 🡪 lobulated and circumferential soft tissue mass in the antero-posterior wall of the RA  Cervical lymph node biopsy 🡪 diagnosed RDD | RA (extending to the IAS, anterior tricuspid valve, IVC-atrial junction, SVC, and ascending aorta) | Dexamethasone, deflazacort, and rituximab | 6-month follow up with resolution of pericardial effusion and no change in the size of intracardiac masses |
| Laubham, 2018 | Epigastric pain | EKG 🡪 atrial fibrillation with rapid ventricular response  Echocardiogram 🡪 LV hypokinesis, EF of 20%  Right-heart catheterization 🡪 cardiogenic shock  cMRI 🡪 LV noncompaction cardiomyopathy  PET-CT 🡪 avid uptake of right suprarenal mass and smooth myocardial uptake  Adrenal biopsy 🡪 diagnosed RDD  Myocardial biopsy 🡪 diagnosed RDD | Myocardium | Prednisone | Follow-up (interval unspecified) revealed improving EF and interval decrease in adrenal/myocardial uptake with PET-CT. |
| Heidarian, 2017 | Chest pain, dyspnea, presyncope | Echocardiogram 🡪 LA mass | LA (extending into the IAS and anterior mitral valve leaflet); 8.0 cm | Surgical resection 🡪 diagnosed RDD | 13-month follow up without recurrence. |
| Summers, 2017 | Chest pain, dyspnea | Chest CT 🡪 large mediastinal mass adjacent to the RA  Echocardiogram/cMRI 🡪 pericardiac mass involving the RA and TV with increased uptake  Surgical myocardial biopsy 🡪diagnosed RDD | RA (involving the tricuspid valve); 9.0 cm | Prednisone, vinblastine, etoposide and subsequent surgical resection at 1-year due to progressive disease | Follow-up (unspecified interval) with complete resolution of symptoms. |
| Khanna, 2016 | Chest pain, dyspnea | TTE 🡪 large RA mass  Coronary angiography 🡪 normal coronary arteries  cMRI 🡪 RA mass arising from the AV groove and causing RVOT obstruction | RA (extending into the tricuspid annulus and IAS); 6.0 cm | Surgical resection 🡪 diagnosed RDD | Not reported |
| Moon, 2016\* | Dyspnea, pulmonary edema | TTE 🡪 biventricular hypertrophy and RA mass  cMRI 🡪 thickened RA wall with normal gadolinium kinetics without contrast enhancement  Myocardial biopsy 🡪 diagnosed RDD | RA, myocardium | Dexamethasone, cisplatin, etoposide | Follow up (interval unspecified) with improvement in myocardial infiltration and reduction in cardiac mass, but worsening infiltration of the AV and AI |
| Sendrasoa, 2016 | Lymphadenopathy, malaise, fever, weight loss, ventricular tachycardia | Chest CT 🡪 pleura effusion  Echocardiogram 🡪 septal hypertrophy, EF of 36%, pericardial effusion  Skin and lymph node biopsy 🡪 diagnosed RDD | IVS | IV methylprednisolone, electric cardioversion | Died 2 months later due to multi-organ dysfunction.  Autopsy not performed |
| Schaffer, 2016 | Chest pain, fever | EKG 🡪 3rd degree AVB  Myocardial needle biopsy 🡪 diagnosed RDD | RA (originating above the tricuspid valve, extending into the IAS, and encircling the aortic root) | Permanent pacemaker placement, orthotopic heart transplant | 18- month follow up, alive. |
| Chaitanya, 2015 | Chest pain, dyspnea | EKG 🡪 right axis deviation, incomplete right bundle branch block, RV hypertrophy  CXR 🡪 prominent RVOT  TTE 🡪 homogenous oval mass in the lateral wall of the main pulmonary artery with partial obstruction  cMRI 🡪 Infiltrating mass in relation to the ventricular outflow tracts, LA, LV, IVS, with circumferential thickening of the pericardium  Endovascular myocardial biopsy 🡪 diagnosed RDD | Pericardium, RVOT, and main pulmonary artery (extending into the LA, LV, IVS, and aortopulmonary window); 2.6 cm | Surgical resection (partial), steroids | 1-month follow up with a small residual mass in the RVOT, without recurrence of symptoms |
| Daruwalla, 2015 | Palpitations | EKG 🡪 LV hypertrophy  TTE 🡪 echodense mass in the LA  cMRI 🡪 heterogenous broad base pass with mild postcontrast enhancement and central T2 hypointensity  CTA 🡪 confirmed intra-cardiac location of mass (vs. mediastinal) with infiltrative appearance  PET 🡪 avid uptake in LA mass  Thoracoscopic guided myocardial biopsy 🡪 inconclusive | LA (arising from the roof and the superior-inferior wall); 1.9 cm | Surgical resection 🡪 diagnosed RDD | Annual follow up with cMRI scheduled |
| Lao, 2014 | Incidental finding during annual chest CT | EKG 🡪 non-specific T-wave changes  Chest CT 🡪 solitary soft tissue mass in the left pericardium  PET-CT 🡪 irregular pericardial thickening and mild uptake | Left pericardium (partial involvement of underlying myocardium); 3.0 cm | Surgical resection 🡪 diagnosed RDD | 5-month follow up without signs of recurrence |
| Ozbudak, 2014 | Chest pain, dyspnea | TTE, chest CT, cMRI 🡪 RA mass  Chest CT/cMRI 🡪 RA mass extending to the AV groove, with resultant narrowing of the SVC | RA (originating from the wall of SVC and extending to IAS); 3.7 cm | Surgical resection (indicated due to SVC narrowing) 🡪 diagnosed RDD | Not reported |
| Bi, 2014 | Dyspnea, fatigue | Echocardiogram🡪 pericardial effusion and RA mass  Chest CT 🡪 irregular RA mass with heterogeneous enhancement, pericardial effusion, pleural effusion | Myocardium, RA; 4.0 cm | Surgical resection 🡪 diagnosed RDD | 7-month follow up without recurrence |
| Aguilar, 2012\* | Chest pain, dyspnea, edema, diplopia | CXR/Chest CT 🡪 large pericardial effusion, retroorbital infiltrate  Pericardial biopsy 🡪 diagnosed RDD | Pericardium | Not reported | Not reported |
| Yontz, 2012 | Chest pain, dyspnea | CXR 🡪 cardiomegaly  EKG 🡪 3rd degree AVB  Chest CT 🡪 soft tissue density originating in the IAS  PET-CT 🡪 uptake in the IAS and mediastinal mass  CT-guided needle myocardial biopsy 🡪 diagnosed RDD | IAS (extends into the bilateral atria, abutting the AV groove) | Permanent pacemaker placed | Follow up (unspecified interval) with intermittent recurrence followed by spontaneous remission and new-onset seizures |
| Sarraj, 2012 | palpitations | EKG 🡪 left bundle branch block, inverted T-waves in the precordial leads  TTE 🡪 large LV mass  Chest CT 🡪 LV mass penetrating the myocardium  cMRI 🡪 mass with homogenous hyperintense late contrast enhancement on T1 | LV (anterolateral wall); 4.7 cm | Surgical resection 🡪 diagnosed RDD | 3-month follow up without recurrence. |
| Ajise, 2011 | Chest pain, dyspnea, atrial flutter, hypotension | Echocardiogram/chest CT🡪 pericardial effusion and RA mass  cMRI🡪 irregular, lobulated, circumferential RA mass without necrosis/hemorrhage | RA and IAS; 3.5 cm | Surgical resection 🡪 diagnosed RDD | 18-month follow up without recurrence. |
| Chen, 2011 | Chest pain, dyspnea, edema, recurrent pericardial/pleural effusion | Chest CT 🡪 pericardial and pleural effusion  Pleural biopsy 🡪 normal | Epicardium (hemorrhagic effusion) | No response to prednisone.  Autopsy 🡪 diagnosed RDD | Died 2.5 years after symptom onset |
| Richter, 2010 | Chest pain | Stress test 🡪 patient developed A-Flutter  Echocardiogram 🡪 mass involving LA and posterior wall of the LV mass  PET-CT 🡪 avid uptake in the cardiac mass, pulmonary nodule, right femur  CT-guided core-needle lung biopsy and subsequent video-assisted wedge biopsy 🡪 necrotizing pneumonia with aspergillus  Bone biopsy 🡪 non-diagnostic  Core needle myocardial biopsy 🡪 diagnosed RDD | LA, LV (posterior wall, resulting in a fixed mural leaflet) | Steroids, chemotherapy | Not reported |
| Maleszewski, 2010 | Dyspnea, edema, night sweats, ARDS | Symptoms attributed to CMML | RA (adjacent to the tricuspid annulus); 1.5 cm | Autopsy 🡪 diagnosed RDD | Death |
| Maleszewski, 2010 | Chest pain | MRI 🡪 mediastinal lymphadenopathy, irregularly shaped RA mass  Mediastinal lymph node biopsy 🡪 diagnosed RDD  Myocardial biopsy 🡪 diagnosed RDD | RA (extending from the tricuspid annulus to the entrance of IVC); 2.8 cm | Corticosteroids | 2-year follow up chest CT showed minimal interval change in the size of the mass. |
| Da Xu, 2009 | Dyspnea, anasarca | US/CT/PET-CT 🡪 hydropericardium, hydrothorax, thickened pleura | Epicardium | Autopsy 🡪 diagnosed RDD | Died 2 years after symptom onset |
| Scheffel, 2006 | Traumatic fall | Chest CT 🡪 circumferential thickening of the RA | RA (extending to the SVC and ascending aorta) | Autopsy 🡪 diagnosed RDD-related cardiac infiltration | Death unrelated to RDD |
| Buchino, 1982 | Unknown | Lymph node biopsy 🡪 diagnosed RDD | Tricuspid valve, pulmonary vein, epicardium; 0.5-1.0 cm | Multiple surgeries/radiation therapy for central nervous system, bone, and lymph node manifestations (none cardiac)  Autopsy 🡪 diagnosed RDD-related cardiac manifestation | Death 10 years after onset from disease progression |
| AVB = atrioventricular block; CS = Coronary sinus; cMRI = Cardiac magnetic resonance imaging; CT = Computed tomography; CXR = Chest x-ray; EKG = Electrocardiogram; EF = Ejection fraction; IAS = Interatrial septum; IVC = Inferior vena cava; IVS = Interventricular septum; TEE = Transesophageal echocardiography; TTE = Transthoracic echocardiography; RA = Right atria; RCA = Right coronary artery; RDD = Rosai-Dorfman disease; RV = Right ventricle; RVOT = Right ventricular outflow tract; SVC = Superior vena cava; LA = Left atria; LV = Left ventricle; PET-CT = Positron emission tomography-computed tomography; | | | | | |