# [Pharmacologic stress cardiovascular magnetic resonance in the pediatric population: A review of the literature, proposed protocol, and two examples in patients with Kawasaki disease.](https://www.ncbi.nlm.nih.gov/pubmed/31498562)

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**Take-Home Points:**

* Pharmacologic stress cardiovascular MRI (PSCMR) is an underused but potentially very helpful modality in assessing certain types of pediatric CHD, especially those with coronary abnormalities or coronary reimplantation.
* Further focused research as well as cost-analysis may be useful, but integrating this with a larger stress perfusion testing center may be most effective.



**Commentary from Dr. Jared Hershenson (Greater Washington DC), section editor of Pediatric Cardiology Journal Watch:** A large trial recently published in JACC on MRI stress perfusion in adults with coronary artery disease received a lot of attention due to the high sensitivity and cost-effectiveness of what is a clearly underused and under-available modality. This was a review article on its use in the pediatric/adult congenital population along with proposed protocols.  Exercise stress testing is of course not feasible for all patients, but the sensitivity and specificity may be low, especially when trying to assess perfusion of the right ventricle. This is also a known limitation of nuclear testing. Often times, pediatric cardiologists need to make decisions based on echo findings, standard stress testing, or sometimes resort to an invasive cardiac catheterization, but which still do not always provide the prognostic information necessary to decide whether surgery or other management needs to occur.

Table 1 lists high risk cohorts who could theoretically benefit from PSCMR which can be categorized as surgical coronary reimplantation, anomalous coronary artery (AAOCA), acquired disease (such as Kawasaki disease (KD)), or systemic right ventricle. Inotropic agents (dobutamine) and coronary vasodilator agents can be used to mimic physical exercise. Dobutamine may be better utilized when there is concern for dynamic obstruction such as in AAOCA or myocardial bridging. A newer vasodilating agent, Regandenoson, has a better side effect profile and only requires a single bolus instead of a continuous infusion as needed in older agents (adenosine/dipyridamole). The authors list the few, relatively small, studies done using PSCMR, and highlight the fact that there is data to suggest higher sensitivity and specificity, along with the advantages of no radiation exposure and not being limited by acoustic windows (as stress echo may be). They also provide a suggested protocol along with dosage when using dobutamine, adenosine, and regadenoson and provide a conceptual framework for imaging (Figure 1). Finally, they discuss 2 case reports of patients with KD and the clear utility of PSCMR. The first case was a patient with a history of giant aneurysms that had mostly resolved and with a normal treadmill stress test. PSCMR showed perfusion defects, and the patient ultimately underwent cutting balloon dilation. The 2nd case was a young patient (4 years old), too young to undergo standard stress testing, with giant aneurysms and perfusion defects. A cath showed near occlusion of the LAD and he underwent CABG.

Hopefully, there will be further published studies looking at PSCMR in pediatric patients, as this is a modality that can be very helpful in certain subgroups for which current testing is limited.



