# [Usefulness of Red Blood Cell Distribution Width in the Assessment of Hemodynamics After Tetralogy of Fallot Repair.](https://www.ncbi.nlm.nih.gov/pubmed/30799372)

Kojima T, Imamura T, Osada Y, Muraji S, Nakano M, Oyanagi T, Yoshiba S, Kobayashi T, Sumitomo N.

Circ J. 2019 Feb 23. doi: 10.1253/circj.CJ-18-1016. [Epub ahead of print]

PMID: 30799372

**Take Home Points:**

* In this study of children undergoing routine hemodynamic assessment within a year of tetralogy of Fallot repair, higher red blood cell distribution width (RDW) was predictive of:
	+ Suboptimal hemodynamics, including higher right ventricle pressure/left ventricle pressure ratio.
	+ Elevated CVP.
	+ Lower mixed venous oxygen saturation.
	+ Increased pulmonary stenosis severity.
	+ Increased pulmonary regurgitation severity by echo.
	+ Residual ventricular septal defect.
* Also, RDW was particularly associated with higher reoperation risk and the RDW tended to improve after reoperation.



**Commentary by Dr. Maan Jokhadar (Atlanta), section editor of ACHD Journal Watch:** Red blood cell distribution width (RDW) is routinely reported as part of a complete blood count and is clinically useful for anemia evaluation. Elevated RDW is a sign of nutritional deficiency, including iron deficiency, vitamin B12 deficiency, etc. There is also a growing body of literature linking elevated RDW to worse outcomes with heart failure, coronary disease, pulmonary hypertension, and congenital heart disease, including Fontan patients. The reasons for these associations are not clear but could be related to inflammatory stress, nutritional deficiency, and inadequate production of erythropoietin in the setting of a suboptimal hemodynamic state.

Dr. Kojima and colleagues in Saitana, Japan performed a retrospective analysis of 50 children who were admitted for postoperative cardiac catheterization after surgical tetralogy of Fallot repair, which is part of routine postoperative management in this center. The mean age at the time of surgical repair was about 6.6 +/- 2.1 months (range 3 to 12 months) and cardiac catheterization was performed 11.3 +/- 9.6 months after surgery. About 56% had transannular patch repair and about 24% had a previous palliative shunt. Ten patients had residual VSD. Seven patients had reoperation due to significant VSD in 4 patients and pulmonary stenosis in 3 patients.

In this pediatric population undergoing routine hemodynamic assessment after recent tetralogy of Fallot repair, higher RDW was associated with higher right ventricle pressure/left ventricle pressure ratio, elevated CVP, lower mixed venous oxygen saturation, increased pulmonary stenosis severity, increased pulmonary regurgitation severity by echo, and residual ventricular septal defect. Also, RDW was particularly associated with higher reoperation risk and the RDW tended to improve after reoperation. Thus, RDW was associated with both right ventricle volume overload and pressure overload. In addition, RDW appeared to be more predictive than BNP in this population.

These data are an important step forward and bolster the argument that RDW may have value as part of the hemodynamic and prognosis assessment in patients with repaired tetralogy of Fallot. However, larger prospective studies are needed to better understand the role of RDW in this realm.