

# Psoriasis and acutely decompensated heart failure: a hemodynamic conundrum

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**Introduction:** Psoriasis has been reported as an unusual cause of high-output heart failure (HF), and high mixed venous oxygen saturation (SvO<sub>2</sub>) due to changes in the skin microcirculation, including vasodilatation and functional arterio-venous shunting that may increase cutaneous blood flow up to 10 times<sup>1,2</sup>. We hypothesize that due to abnormal redistribution of blood flow between skin and other organs, using SvO<sub>2</sub> may represent an obstacle to an accurate measurement of cardiac index (CI) by the Fick principle in patients with a combination of severe psoriasis and HF with reduced ejection fraction (HFrEF).

**Case report:** 54-year-old male patient was admitted in February of 2023 with acute decompensated biventricular HF, caused by dilated cardiomyopathy. The patient had signs and symptoms of volume overload and low cardiac output, and a skin exam revealed severe psoriasis. He was treated with intravenous diuretics, inotropes, and continuous hemofiltration. Right heart catheterization (RHC) showed pulmonary hypertension with elevated filling pressures of both ventricles and normal pulmonary vascular resistance. Unexpectedly, SvO<sub>2</sub> was around 80%, and the calculated CI using the Fick formula was high (4.4 L/min/m<sup>2</sup>). Diagnostic work-up excluded an intracardial shunt. As the calculated CI was assumed to be inaccurate due to a sampling blood error, the RHC was repeated. Again, CI was high (5.5 L/min/m<sup>2</sup>). Systemic vascular resistance (SVR) was surprisingly normal even though patient presented with low output symptoms. We hypothesized that the redistribution of blood from vasoconstricted areas in hypoperfused organs toward vasodilated psoriatic skin with functional arterio-venous shunting was responsible for both the total sum of normal SVR and high SvO<sub>2</sub>. The RHC was repeated, but this time by using the thermodilution method which finally confirmed low CI (1.8 L/min/m<sup>2</sup>).

**Conclusion:** This report shows that in the case of a combination of HFrEF and severe psoriasis, the Fick principle is inaccurate for the calculation of CI. It also highlights the importance of using alternative methods in the case of contradictory results, given the fact that each method uses different physical principles that become useful in situations when these principles are compromised by the nature of the underlying disease.

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## LITERATURE

1. Journal of Hospital Medicine. High-Output Heart Failure in a Patient with Exfoliative Erythrodermic Psoriasis. <https://shmabstracts.org/abstract/highoutput-heart-failure-in-a-patient-with-exfoliative-erythrodermic-psoriasis/> (September 9, 2023)
2. Hern S, Stanton AW, Mellor R, Levick JR, Mortimer PS. Control of cutaneous blood vessels in psoriatic plaques. *J Invest Dermatol.* 1999 Jul;113(1):127-32. <https://doi.org/10.1046/j.1523-1747.1999.00638.x>