# [Outcome of the Glenn procedure as definitive palliation in single ventricle patients.](https://www.ncbi.nlm.nih.gov/pubmed/31761401)

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**Take Home Points:**

* A single center retrospective review described the outcomes in a heterogenous group of patients with complex congenital heart disease undergoing SV-Glenn shunt as definitive therapy
* In the SV-Glenn group, there is significant peri-operative / early mortality (within 6 months): (±7% of all TCPC completions) – mainly attributed to HLHS
* Of the 25 SV-Glenn survivors, 8 had contra-indications to TCPC completion. In this group, only 1 survived to adulthood.
* In selected adults, SV-Glenn shunt is possible with reasonable medium and long term outcomes. Co-morbidities like heart failure, arrythmias, stroke and endocarditis are frequently encountered.
* This is a retrospective review, and selection bias in particular needs to be borne in mind when interpreting these results



***Commentary from Dr. Blanche Cupido (Cape Town, South Africa), section editor of ACHD Journal Watch:*** The Glenn Shunt is a palliative surgery involving an end-to-end anastomosis between the superior caval vein and the pulmonary arteries. It is usually the intermediary step toward Fontan circulation or TCPC (total cavo-pulmonary connection) completion but is, at times, encountered in Adult Congenital Heart Disease Practice as a definitive procedure in select patients with either single ventricle physiology (SV-Glenn) or biventricular physiology (one-and-a-half-repair – OAHR).

This is a single center study at a tertiary referral unit in Belgium (Leuven Hospital) that aimed to describe the characteristics of the SV-Glenn population, their clinical features prior to definitive palliation and their long-term outcomes in term of morbidity and mortality. All patients from the local paediatric and adult database who underwent a Glenn palliation before May 2018 were included.

Original anatomical data, clinical – and demographic data, imaging and haemodynamic data were recorded. The peri-operative complications (bleeding, thrombotic complications, need for re-intervention/ take-down, occurrence of heart failure) were noted. Early (within 6 months of Glenn-SV palliation) and late (>6 month) mortality were recorded. At the last follow-up, clinical data and outcome data pertaining to heart failure, effort tolerance (NYHA class), arrythmias, thrombotic events, infective endocarditis, need for pacing, presence of cirrhosis and protein-losing enteropathy were documented.

![A screenshot of a social media post

Description automatically generated]()

In total, 65 patients underwent a Glenn procedure without a TCPC completion. Of these, 21 had a Glenn with biventricular circulation (excluded), leaving 44 with a univentricular circulation Glenn (SV-Glenn). A bidirectional Glenn was performed in 43 patients with a classic Glenn procedure in one patient. The median age at Glenn procedure with 11.9 months.

Forty-three percent (n=19) died within 6 months after the Glenn shunt. Seven of these patients had hypoplastic left heart syndrome. The cause of death was cardiac in 15 patients (11 had cardiogenic shock, 4 had peri-operative bleeding or thrombotic events), in 3 patients the cause was unknown and in one case it was non-cardiac.

A total of 25 patients with a SV-Glenn shunt survived beyond 6 months. In this group, the median age at time of Glenn was 6.3 years. Eight patients were aimed for TCPC but had contraindications to TCPC completion (3 had small pulmonary arteries, 2 had severe ventricular dysfunction, 1 had significant co-morbidity, 1 had sudden cardiac death). For the other 17, TCPC was not thought to be of potential benefit.

Cardiac cath data was available in 19 patients prior to Glenn procedure. The median mean PA pressure was 16mmHg, wedge pressure 9mmHg and aortic saturation 86%. Post Glenn procedure, median mean PA pressure was 19mmHg, wedge pressure 16mmHg, and aortic saturation 85%.



Median follow-up of this cohort was 11 years. Five late deaths (see figure 2 above) occurred in the SV-Glenn group (2 were due to heart failure, 1 sudden cardiac death, 1 due to hemoptysis, 1 unknown). Three deaths occurred in patients unsuitable for a TCPC (38% mortality over a median follow-up of 4.5 years).

In the rest of the cohort, the Glenn shunt improved saturation, offloaded the systemic ventricle – but without a planned TCPC, the mortality was 12% over a median follow-up of 27 years.

Eight patients underwent SV-Glenn during adulthood (ages ranged from 25-59 years) due to progressive desaturation resulting in functional impairment. The median mean PA pressure was 17mmHg and the wedge mean 12mmHG. One patient died in the perioperative period and in the remaining patients, all but one showed symptomatic improvement, both in terms of saturation and functional capacity.