



Transcatheter Aortic Valve Replacement Restoring Candidacy for Liver Transplant in Cirrhotic Patients



Mirna Kaafarani MD Candidate ¹, Omar Shamma MD², Syed Muhamad Jafri MD²

1- Wayne State University School of Medicine, 2- Gastroenterology Department, Henry Ford Hospital

Introduction

The Hemodynamic Risk of Aortic Stenosis

- Severe aortic stenosis (AS) has been suggested to be a **strong predictor for perioperative mortality** in noncardiac surgeries¹⁻³
- AS is classified as severe when: **transaortic velocity is ≥ 4.0 m/s or the aortic valve area is < 1.0 cm², or a mean gradient of ≥ 40 mmhg.**⁴⁻⁶

The Problem for Cirrhotic Patients Specifically

- The current guidelines for preoperative workup of orthotopic liver transplant (OLT) recommend an echocardiogram and cardiac testing that **classically rules out AS patients.**⁷
- Surgical aortic valve replacement in the setting of liver cirrhosis has been shown to **increase mortality, complications, cost, and length of hospital stay.**⁸

The Potential Solution of TAVR

The relatively novel transaortic valve replacement (TAVR) has been **approved for both high and minimal risk patient** with severe AS and is growing as the **treatment of choice** in those populations.^{9,10}

Methods

A **retrospective chart review** was performed on patient records that underwent liver transplant at a single large tertiary care center between **2017 and mid-2021**. We extracted **demographic and long-term outcome data**.

472 HFHS liver transplant patients

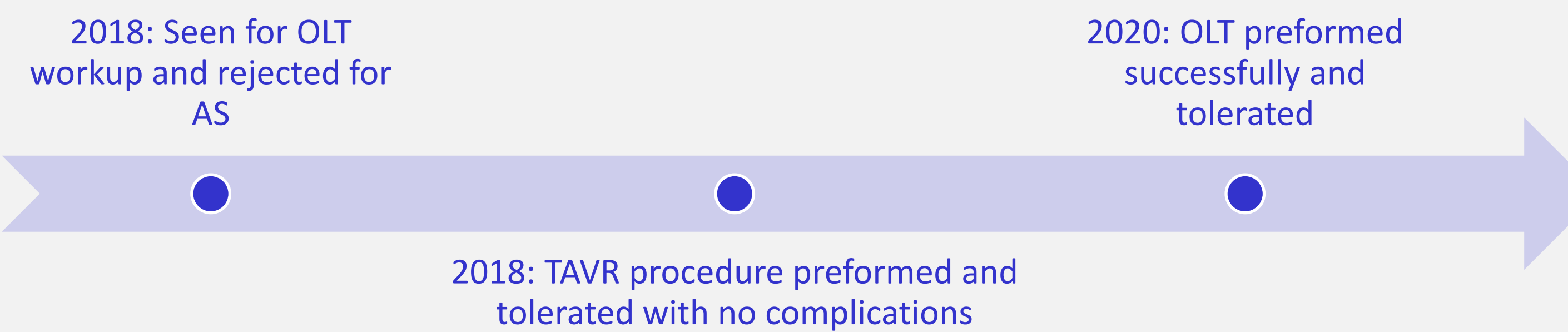
Of those, who had severe aortic stenosis?

Of those, who was Ok'd for a TAVR?

2 cases

Case Healthcare Courses

Patient #1: 48-year-old, white male with a tricuspid aortic valve and a history of alcoholic cirrhosis with portal hypertension, alcoholic hepatitis, gastric sleeve, and morbid obesity. Post OLT course complications included a self-limiting hematoma in the left lower quadrant.



Patient #2: 63-year-old, white male with a bicuspid aortic valve and a history of alcoholic cirrhosis, esophageal varices, and a surgically replaced aortic valve. Post OLT course complications included a transient ischemic attack (right ICA) that was treated with anticoagulation therapy as well as the development of an episode of atrial fibrillation/flutter that improved with beta blockers.



Results

Survival at 1 year and 2 years post-transplant was **100%**

Graft survival at 1 year and 2 years was **100%** with no evidence of rejection

Mean time of follow-up post-transplant was **27 months**

Echocardiogram Parameters	Patient #1			Patient #2		
	Before TAVR	After TAVR	After OLT	Before TAVR	After TAVR	After OLT
Aortic valve peak gradient (mmhg)	16.9	12.2	16.6	67.7	51.4	50.0
Aortic valves mean gradient (mmhg)	8.4	5.8	9.8	38.3	24.5	25.5
Left ventricular ejection fraction (%)	61	46	55	>70	67	63
Aortic valve area, Vmax (cm ²)	2.22	1.53	3.12	0.92	0.98	1.18

Table 1. Comparison of echocardiogram parameters of aortic valve morphology and function for both patient #1 and #2 before and after TAVR as well as after OLT.

Discussion

The **current literature has only but briefly introduced the idea of TAVR successfully restoring candidacy for OLT** through case reports. Comparisons of cases below:

Levy et al (2019)¹⁴

Description of three cases of patients with **hepatocellular carcinoma instead of cirrhosis** and severe aortic stenosis that were all initially ineligible and then went through successful liver transplants after TAVR procedures. **Their follow ups were shorter ranging from 6-10 months compared to our 24 month follow up.**

Kaliemoorthy et al (2019)¹⁵

Description of two cases of patients with infective endocarditis induced acute **aortic regurgitation instead of aortic stenosis**. The cases still underwent TAVR and then a subsequent living donor liver transplant successfully.

Caughron et al (2021)¹⁶

Concluded that the mortality at discharge and 30 days was similar for a group of 29 patients who had undergone a TAVR with ESLD and ESKD when compared to a control group. They reported **only one successful liver transplant** post TAVR. They did see **an upward trend of mortality at 1-year post-TAVR unlike ours with 100% survival at 2 years post-OLT.**

A common limitation between the current data and our reported cases is the **scarcity in numbers of this patient population to study**. More data of **both male and female of all races** should be gathered to make more concrete conclusions of TAVR's role.

Conclusion & Takeaways

The prevalence of AS in the US has grown to **3.4%** in patients over the age of 75.¹¹

The prevalence of alcoholic fatty liver disease and advanced fibrosis is **still on the rise** in the US.¹³

An approximated additional **270,000** candidates qualify for TAVR in developed countries each year.¹²

These two described cases point to the potential TAVR has at avoiding the cardiac barriers that are imposed on a successful OLT. We wanted to contribute to the currently scarce compilation of case reports that illustrates this role of TAVR. In the dual setting of these growing contraindicated problems, more investigation on the matter is necessary for the future of care in this patient population.

Bibliography



Please scan QR code for full list of references

Acknowledgements

A big thank you to the wonderful **HFHS Sladen Librarians** who helped us with the comprehensive search for case reviews that related to our topic!

