

# Incidence and Long-term outcomes of Dextro-Transposition of the Great Arteries (d- TGA) in the Kingdom of Bahrain

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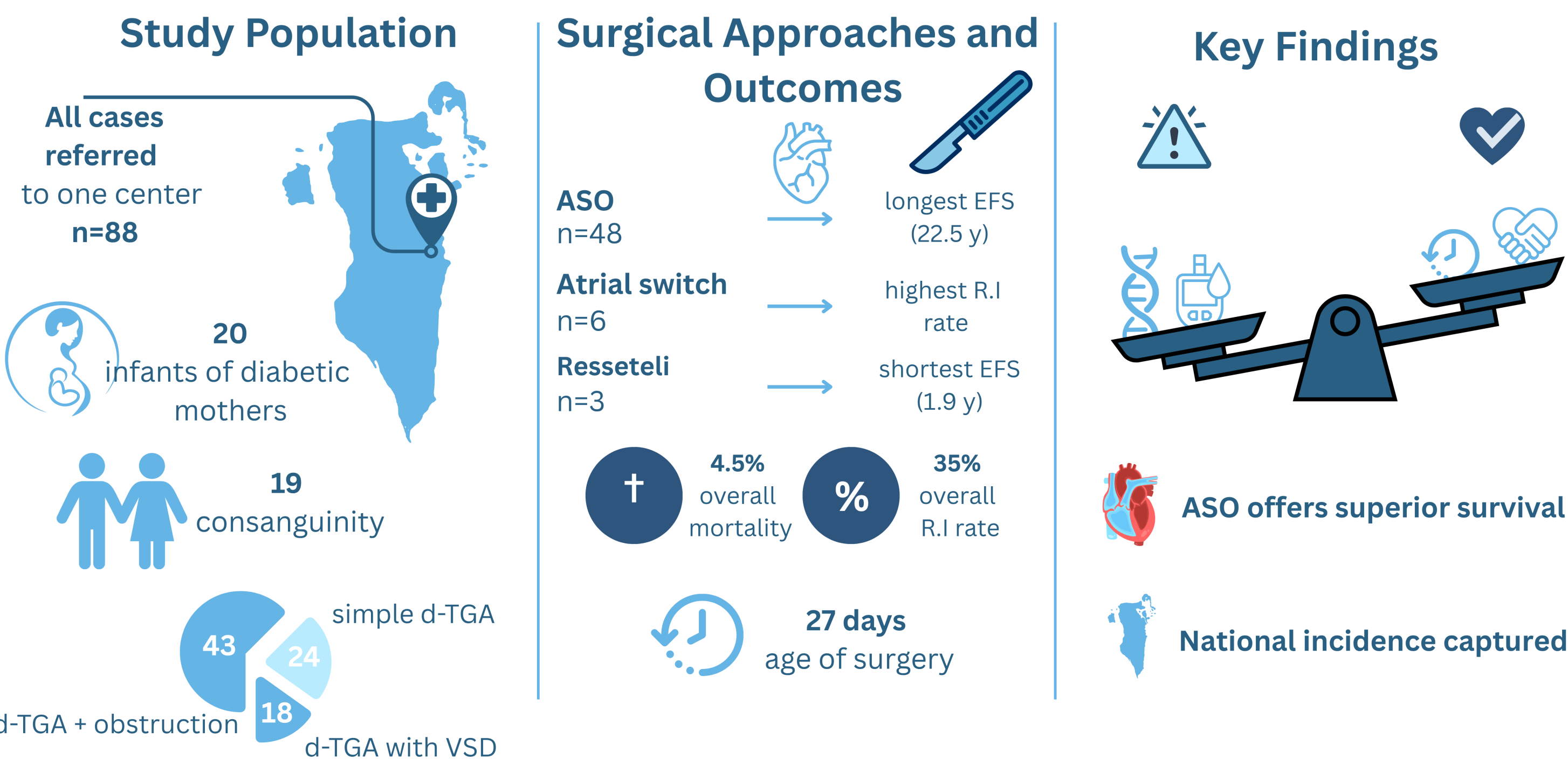
## Introduction

Dextro-Transposition of the Great Arteries (d-TGA) is a congenital heart defect where the aorta arises from the right ventricle and the pulmonary artery from the left ventricle, resulting in parallel rather than normal circulations. Without surgical correction, it is incompatible with life. Although surgical outcomes have improved worldwide, data on long-term results from the Middle East remain limited. This study reviews the incidence, surgical approaches, and outcomes of d-TGA patients in Bahrain between 1983 and 2025.

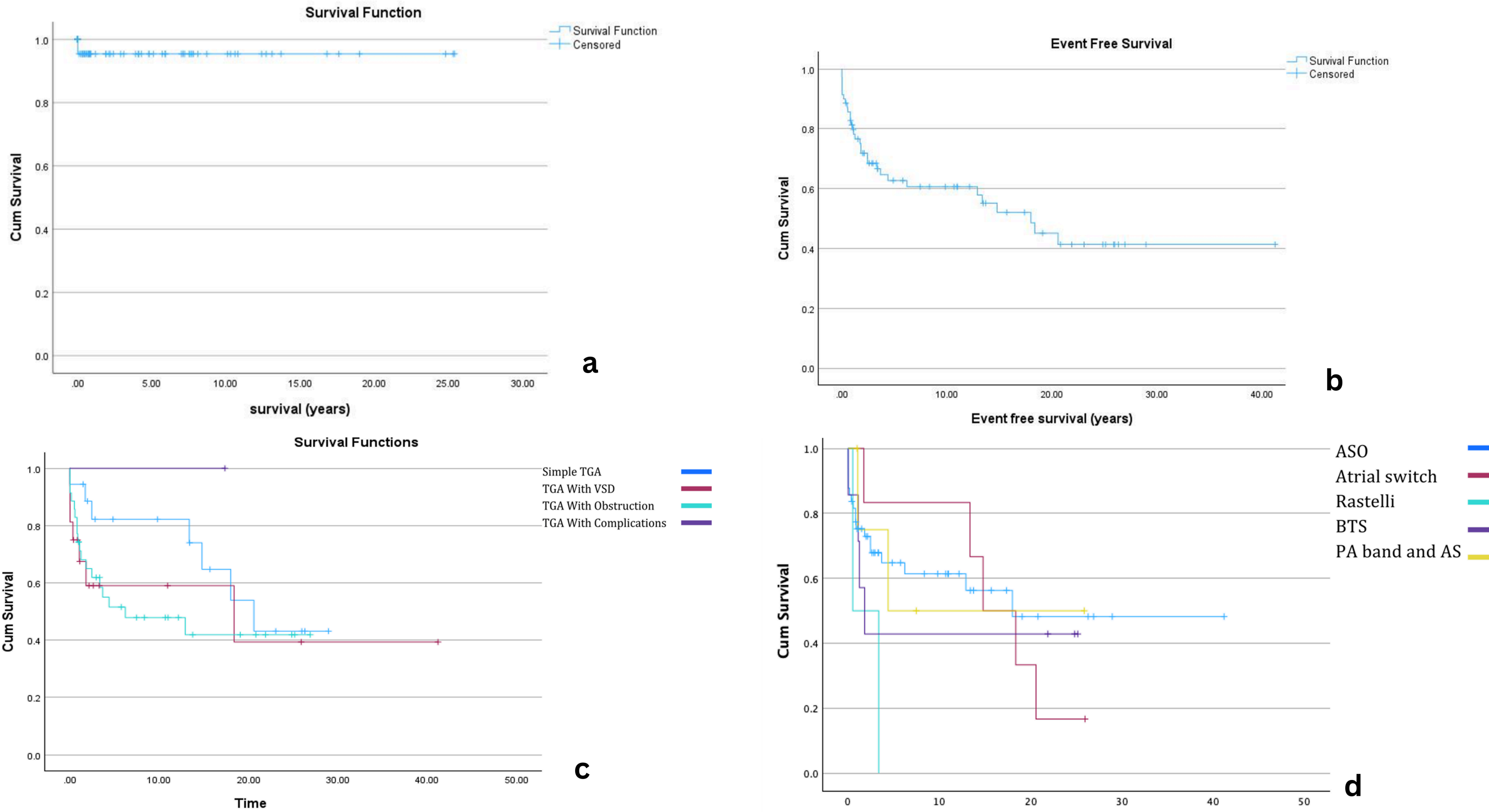
## Methods

A retrospective review was conducted on 88 patients with confirmed d-TGA. Data included demographics, maternal and genetic risk factors, associated anomalies, surgical procedures, and follow-up outcomes. Survival and event-free survival were analyzed using Kaplan–Meier methods, with comparisons by chi-square and ANOVA.

### Long-Term Outcomes of d-TGA Repair in a National Cohort (1983–2024)



Central illustration



Kaplan–Meier survival analyses for patients with dextro-transposition of the great arteries (d-TGA)

## Results

88 patients were included (male-to-female ratio 1.6:1). 20 were born to diabetic mothers, and 19 to consanguineous parents. Incidence rose over time, peaking at 2.58 per 10,000 live births. Median age at surgery declined to 27 days. Early mortality was 4.5%, with one postoperative ASO death. Reintervention was required in 35.2% of cases. Median EFS was highest in simple d-TGA (20.6 years), lowest after Rastelli repair (0.5 years). d-TGA with obstruction was statistically significant associated with postoperative left ventricular outflow obstruction (LVOTO), and simple d-TGA with right ventricular outflow obstruction (RVOTO).

## Discussion

- A male predominance was observed, consistent with international reports.
- High rates of consanguinity and maternal diabetes were identified, highlighting significant regional risk factors.
- The apparent increase in incidence in recent years may reflect improved diagnostic capabilities and reporting practices.
- Surgical outcomes in Bahrain are comparable to global experience, with the arterial switch operation (ASO) demonstrating superior long-term survival and lower complication rates than alternative procedures.

## Conclusion

This is the first GCC-based study reporting long-term d-TGA outcomes. ASO remains the most effective intervention with superior survival and EFS. Consanguinity and maternal diabetes were key risk factors. Early diagnosis, close follow-up, and targeted public health interventions are essential to improving outcomes.

## Acknowledgements

Ethical approval for this study was obtained from Mohammed bin Khalifa bin Salman Al-Khalifa Cardiac Center (MKCC).