Subaortic Membranes Misdiagnosed as Hypertrophic Cardiomyopathy with Obstruction

A Systematic Review of Reported Clinical Cases

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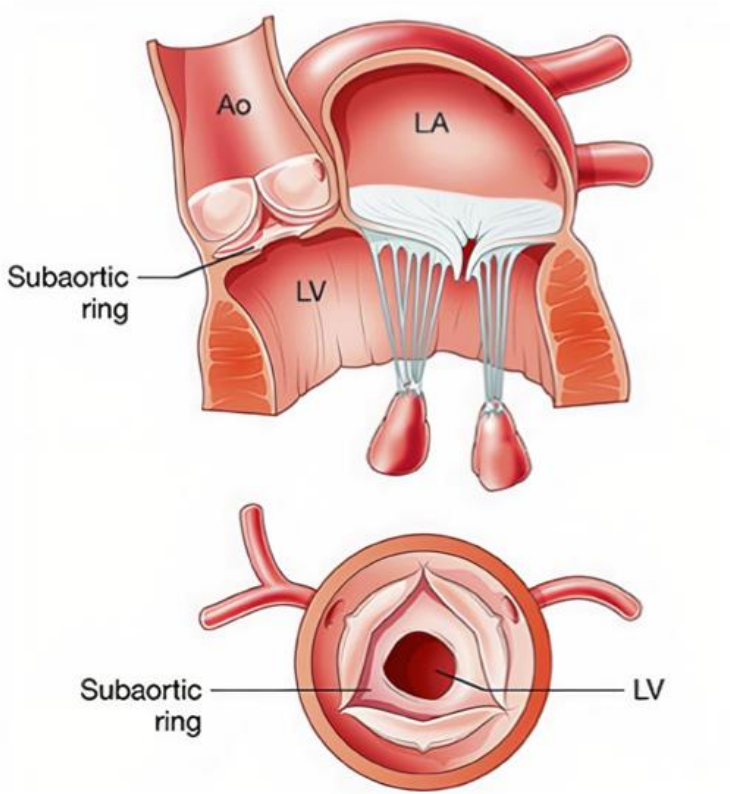
Disclosure of Relevant Financial Relationships

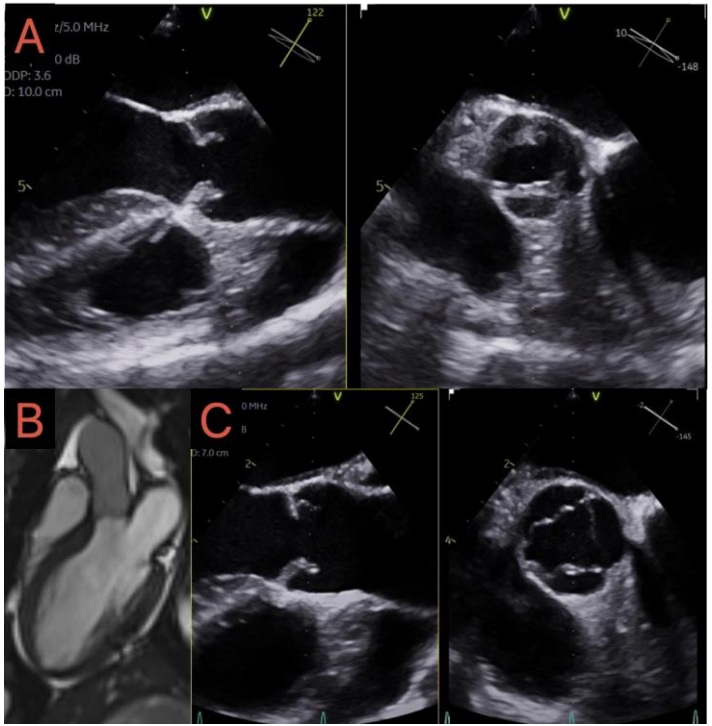
I, Malik Alqawasmi, DO NOT have any financial relationships to disclose.

I, Harris Majeed, DO NOT have any financial relationships to disclose.

Background

- Subaortic membrane: discrete membrane below the aortic valve that causes a fixed obstruction of the left ventricular outflow tract.
- Difficult diagnosis to make and can be mistaken for hypertrophic cardiomyopathy with obstruction.
- Long-standing subaortic stenosis results in left ventricular hypertrophic remodeling that may resemble hypertrophic cardiomyopathy.
- Misdiagnosis often results in inappropriate medical therapy or percutaneous alcohol septal ablation, ultimately delaying definitive surgical resection of membrane.




A
B
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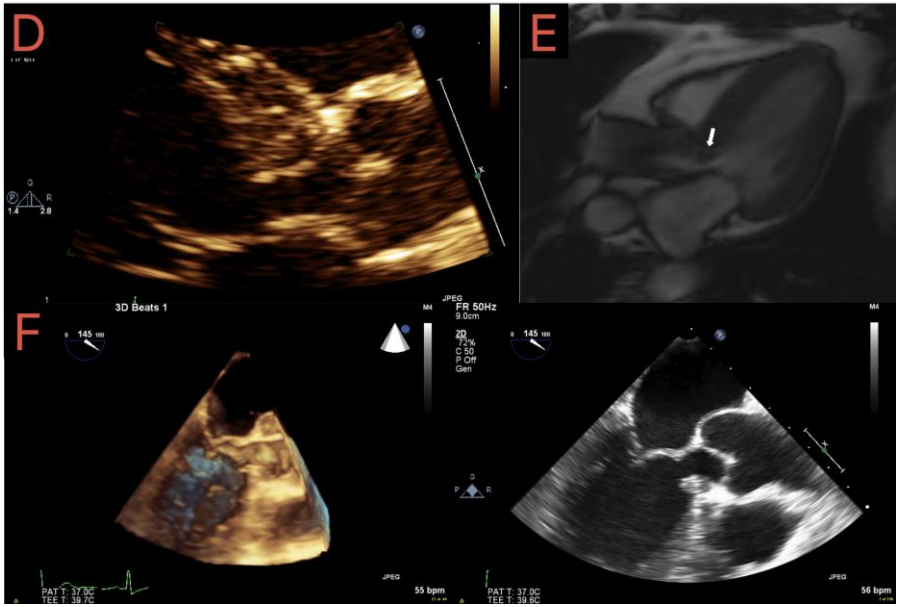

D
E
F
3D Beats 1
FR 50Hz
55 bpm
56 bpm

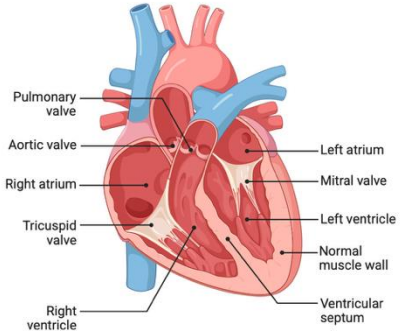
Significance?

- Management of subaortic membranes differs from management of hypertrophic cardiomyopathy with obstruction.
- Subaortic membranes that are symptomatic require surgical resection.
- Hypertrophic cardiomyopathy with obstruction can be managed with beta blockers, calcium channel blockers, disopyramide, mavacamten, or septal reduction with surgical myectomy or percutaneous alcohol ablation.
- Misdiagnosis can lead to mismanagement and delay care.

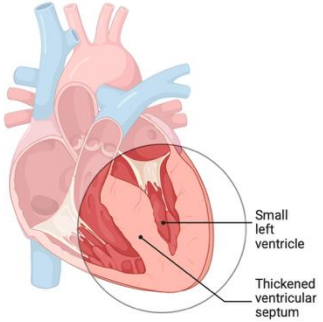
Symptoms
Dyspnea on exertion, syncope, chest pain

Septal hypertrophy
≥15 mm, 13-14 mm can be diagnostic in the proper clinical setting

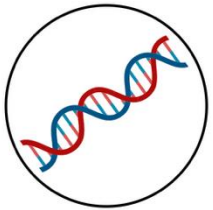
Normal



Hypertrophic cardiomyopathy



Autosomal dominant inheritance

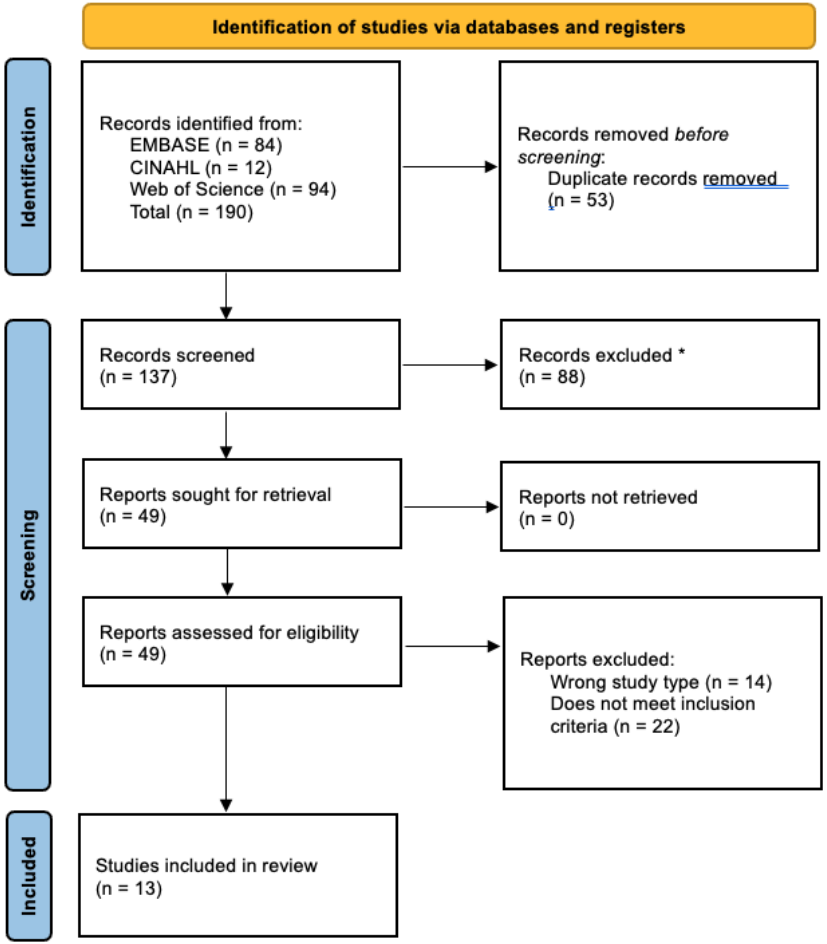


LVOT gradient pressure on TTE
≥30 mmHg, dynamic

	Hypertrophic Cardiomyopathy with Obstruction	Subaortic Membranes
Obstruction	Dynamic due to septal hypertrophy and systolic anterior motion	Fixed due to fibrous membrane below the aortic valve
Diagnosis	TTE often shows dynamic gradient. Genetic testing may confirm diagnosis	TTE less sensitive. TEE or cardiac CT more sensitive
Management	Medical therapy and septal reduction if refractory	Surgical resection
Outcomes	10% chance of recurrence	Unlikely to recur after resection

Methods

- Systematic review of all reported clinical cases in which subaortic membranes were misdiagnosed as hypertrophic cardiomyopathy with obstruction.
- Database search of EMBASE, CINAHL, and Web of Science from 2000 to 2025 identified 190 studies
- After applying inclusion criteria and removing duplicates, 13 reports describing 12 unique adult patients were analyzed
- All patients were initially diagnosed with hypertrophic cardiomyopathy based on clinical presentation and TTE findings but were later revised to have subaortic membranes.


Identification of studies via databases and registers
Identification
Records identified from:
EMBASE (n = 84)
CINAHL (n = 12)
Web of Science (n = 94)
Total (n = 190)
Records removed *before screening*:
Duplicate records removed (n = 53)
Screening
Records screened (n = 137)
Records excluded * (n = 88)
Reports sought for retrieval (n = 49)
Reports not retrieved (n = 0)
Reports assessed for eligibility (n = 49)
Reports excluded:
Wrong study type (n = 14)
Does not meet inclusion criteria (n = 22)
Included
Studies included in review (n = 13)

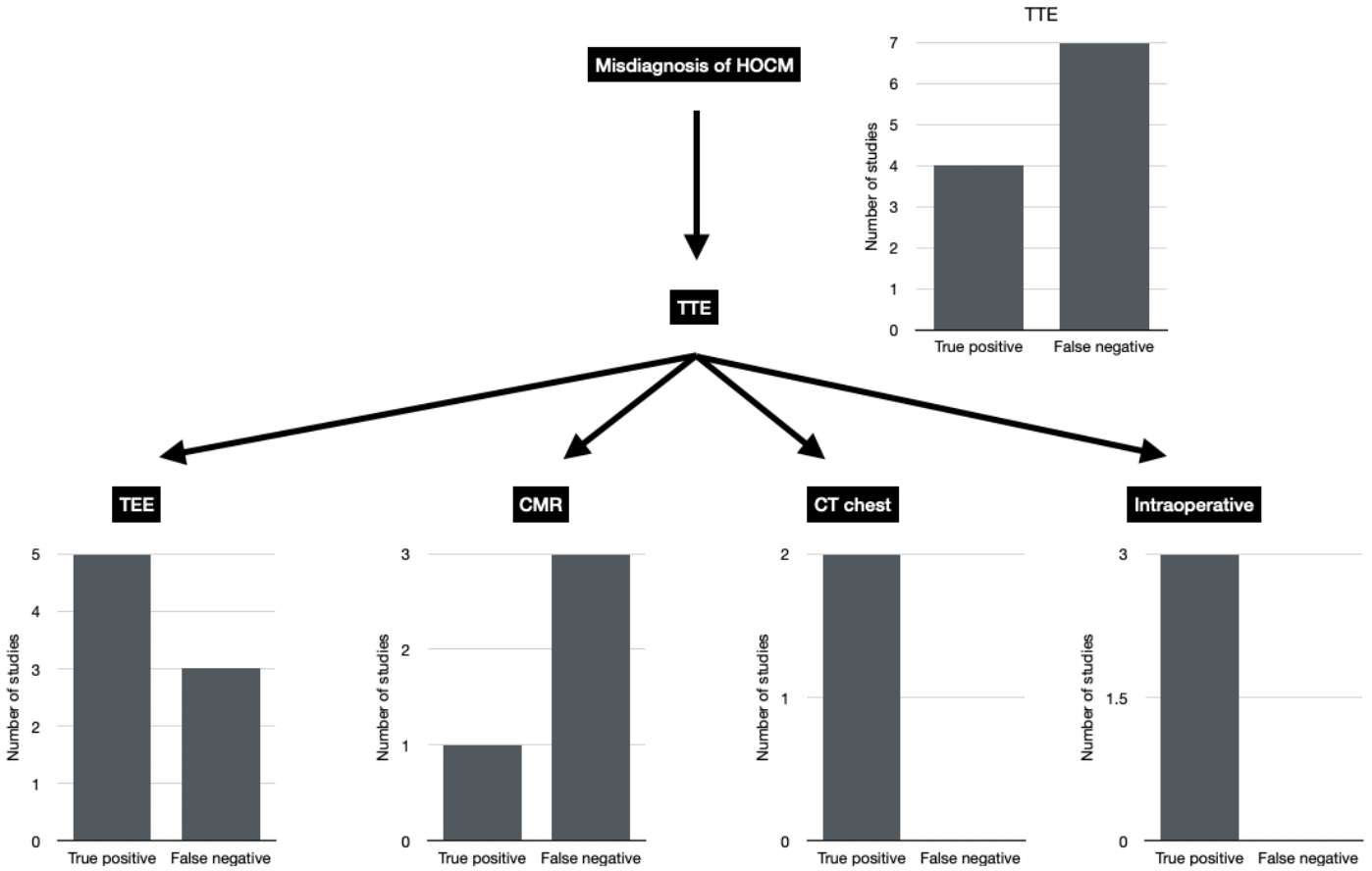
Inclusion Criteria

- Case reports about patients with subaortic membranes that were *misdiagnosed* as hypertrophic cardiomyopathy.
- Key words used in the search included: *Hypertrophic cardiomyopathy* and *Subaortic membrane*.

Results

- Patients ranged from 21 to 67 years of age.
- All patients had symptoms.
- TTE used in all cases failed to identify the membrane initially.
- TEE particularly with three-dimensional imaging was more sensitive.
- Cardiac CT was sensitive but only used in 2 cases (100% detection rate) while an intraoperative diagnosis was made in 3 cases.
- Eleven patients underwent surgical resection resulting in symptomatic improvement and gradient reduction.

Reference	Age	Sex	Prior HCM Management	Confirmed by	Outcome
AHN ET AL., 2013	67	Female	Not mentioned.	TEE	Symptoms improved after the resection of the SAoM.
ALLAHHAM ET AL., 2018	42	Male	Multi-year BB and disopyrimide therapy.	TEE	LVOT myomectomy and membranous ridge resection.
ALQAWASMI ET AL., 2025 (second Pt in the report)	62	Not mentioned.	Chronic medical therapy for HOCM.	TEE	Diagnosis reached, awaiting surgery.
ANDERSON ET AL., 2015	34	Male	Sotalol.	TTE and CT	Tolerated the surgery well with significant improvement.
BOUGIOUKAS ET AL., 2016	58	Female	ASA done one year prior.	Intraoperatively	Surgical resection of membrane with chordal repair.
CHOUKAIR ET AL., 2021	56	Male	Referred for septal myomectomy.	Intraoperative findings confirmed the true diagnosis of SAoM with mitral chordae rupture.	Surgical resection of the SAoM and septal myomectomy.
DOGAN ET AL., 2014	21	Female	Delayed management.	TTE	Declined surgery. Started on medical therapy with BB.
HO ET AL., 2024	Middle-aged	Not mentioned.	Had several ablations and cardioversions as well as amiodarone for atrial fibrillation.	TEE, CMR also showed it.	Not mentioned.
MUSHTAQUE ET AL., 2020	25	Female	BB.	TTE. Also visualized on CT scan.	Not mentioned. as Pt left AMA.
PARATO ET AL., 2017	56	Male	Delayed management.	TTE	Symptoms improved after the resection of the SAoM.
POLINA ET AL., 2022 (2 reports for this one patient)	32	Female	Not mentioned.	Intraoperatively	The post-surgical course was uncomplicated.
SANGODKAR ET AL., 2017	62	Female	Disopyramide.	TEE	Referred for surgical excision of subaortic membrane.


Misdiagnosis of HOCM
TTE
TTE
Number of studies
True positive
False negative
TEE
CMR
CT chest
Intraoperative

Take-Home Messages

- Subaortic membrane is a challenging diagnosis to make especially with TTE alone
- Recommendation is to consider use of multiple imaging modalities. TEE and cardiac CT were effective in this small sample.
- Time point: prior to alcohol septal ablation (in cath lab) or septal myectomy (in the OR) as a final check
- Management pearls for subaortic membranes: surgical resection for symptomatic patients and avoid nondihydropyridine calcium channel blockers - potentially life threatening similar to aortic valvular stenosis.
- Misdiagnosis can delay care and lead to mismanagement

Thank You!