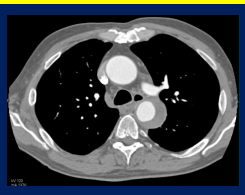
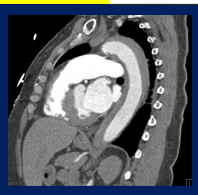
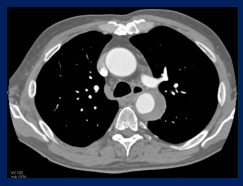
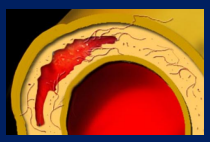
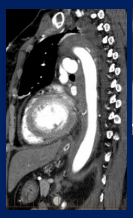
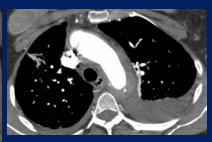
Origins of Intramural Hematomas **IMH:**
Why So Many Prove Benign and Do Well With Medical Treatment
When and How To Treat Them With TEVAR

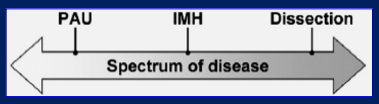


Frank J Criado, MD
MedStar Union Memorial Hospital
Baltimore, MD
Potential COI: **NONE**

IMH accounts for some 10% of cases of AAS

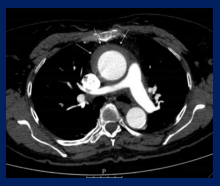
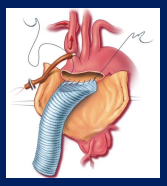
Evolution to full-blown Dissection occurs in 15-20% of IMH cases

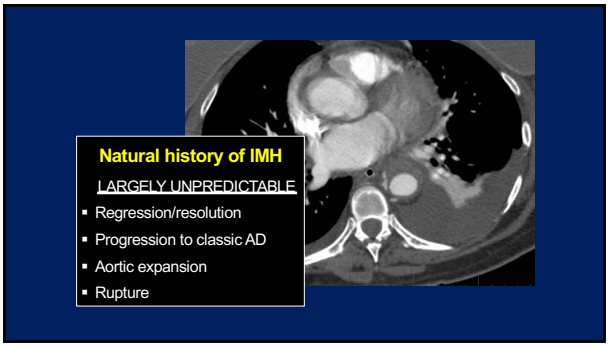


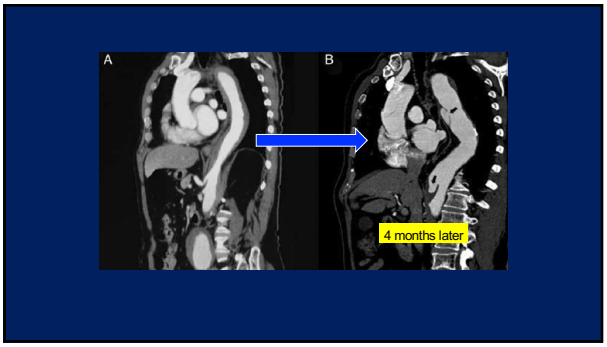
IMH vs **AD**

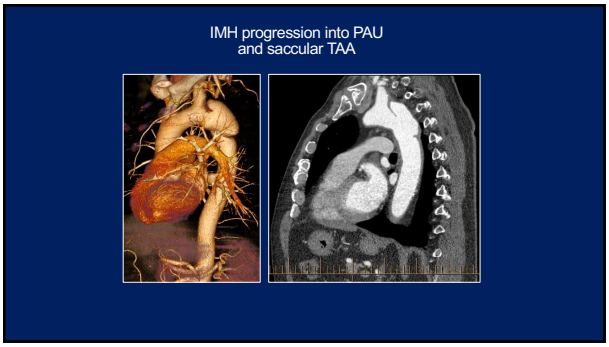
- IMH patients tend to be older
- IMH more likely to involve distal thoracic aorta:
  type B=60%
  type A=35%

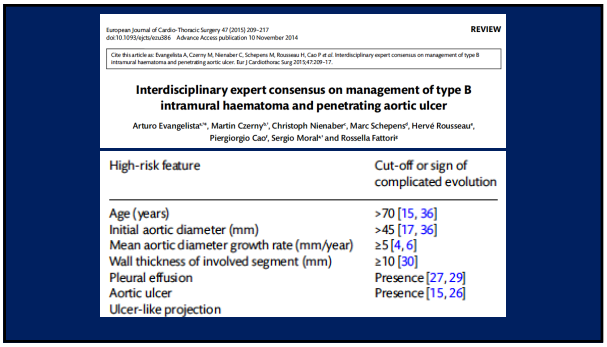
- **Type A IMH** can be lethal and require urgent surgical treatment (graft replacement of asc aorta)









European Journal of Cardio-Thoracic Surgery 47 (2015) 209–217
doi:10.1093/ejcts/ezu286 Advance Access publication 10 November 2014

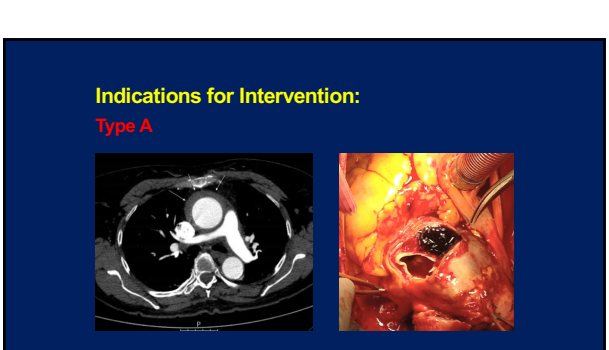
REVIEW

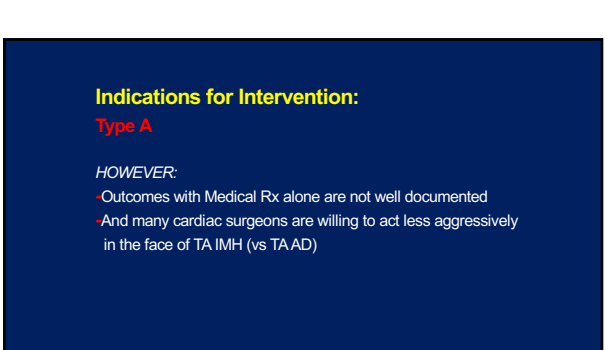
Cite this article as: Evangelista A, Czerny M, Nienaber C, Schepens M, Rousseau H, Cao P et al. Interdisciplinary expert consensus on management of type B intramural haematoma and penetrating aortic ulcer. Eur J Cardiothorac Surg 2015;47:208–17.

Interdisciplinary expert consensus on management of type B intramural haematoma and penetrating aortic ulcer

Arturo Evangelista[a,b], Martin Czerny[b,c], Christoph Nienaber[d], Marc Schepens[e], Hervé Rousseau[f], Piergiorgio Cao[g], Sergio Moral[h] and Rossella Fattori[i]

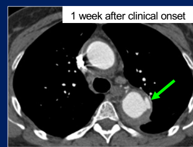
High-risk feature	Cut-off or sign of complicated evolution
Age (years)	>70 [15, 36]
Initial aortic diameter (mm)	>45 [17, 36]
Mean aortic diameter growth rate (mm/year)	≥5 [4, 6]
Wall thickness of involved segment (mm)	≥10 [30]
Pleural effusion	Presence [27, 29]
Aortic ulcer	Presence [15, 26]
Ulcer-like projection	





Indications for Intervention:

Type B



- Aortic diameter >50mm
- IMH thickness >11mm
- Persistent severe pain despite BP lowering and BMT
- 'Image worsening': progression to AD, aneurysm or pseudoaneurysm formation, periaortic/pleural effusion
- Rupture
- IMH associated with PAU (within IMH segment)

From the Southern Association for Vascular Surgery

Medical therapy in type B aortic intramural hematoma is associated with a high failure rate

Check for updates

Tomaz Mesar, MD, Maggie J. Lin, MD, Ishraq Kabir, MD, David J. Dexter, MD, Animesh Rathore, MBBS, *and* Jean M. Panneton, MD, *Norfolk, Va*

ABSTRACT

Objective: Intramural hematoma (IMH) is on the spectrum of acute aortic syndrome, but optimal management is poorly understood. The aim of this study was to evaluate outcomes of patients with type B IMH (TBIMH) after best medical therapy (BMT) and to assess for risk factors associated with failure of BMT.

Methods: This is a single-institution retrospective chart review of all patients with TBIMH between January 2008 and December 2017. Failure of BMT was defined as any of the following end points: aortic rupture, aorta-related death, aortic enlargement to at least 55 mm or growth of >10 mm within 12 months, or need for surgical aortic intervention for failed BMT.

Results: We identified 92 patients, of whom 25 received emergent thoracic endovascular aortic repair, 67 patients were initially managed with BMT, and of these, 32 underwent thoracic endovascular aortic repair within 14 days for early BMT failure. Two additional patients had early BMT failure: one died of aortic rupture due to retrograde type A dissection, and one patient was advised to undergo repair but did not comply and was lost to follow-up. Fourteen patients (20.9%) received endovascular therapy for late failure of BMT after the initial hospitalization. Medical management was successful in 19 patients (28.4%), although 5 patients had aortic enlargement but below the threshold for elective repair (maximal aortic diameter of 55 mm). On univariate analysis, presenting IMH thickness and growth of IMH thickness were risk factors for BMT failure. On multivariate analysis, presenting IMH thickness was the sole predictive risk factor for medical therapy failure (odds ratio, 1.083; 95% confidence interval, 1.021-1.149; $P = .008$), with an odds ratio of 6.810 (95% confidence interval, 1.921-24.146; $P = .002$) with a presenting IMH thickness of ≥8.0 mm, which was the calculated IMH thickness cutoff value with highest sensitivity and specificity to predict failure of BMT (area under the receiver operating characteristic curve = 0.795; $P = .001$; $J = 0.62$).

Conclusions: BMT for TBIMH is associated with a high failure rate and need for interventions. IMH thickness on admission is the most reliable factor to predict failure of BMT. (J Vasc Surg 2020;71:1088-96.)

Keywords: Type B aortic intramural hematoma; TEVAR; Medical therapy

Aortic intramural hematoma (IMH) is bleeding into the aortic wall media without an identifiable intimal tear. The predominant cause is likely to be vasa vasorum rupture in the aortic wall, and it is considered a distinct form of acute aortic syndrome (AAS). IMH is classified as either involving (type A) or not involving (type B) the ascending aorta.[1-4] The course of IMH is unpredictable. Smaller studies describe a spectrum from complete resolution to aortic enlargement, conversion to dissection, and aortic rupture.[5-7] Medical therapy consisting of pain control, anti-impulse therapy, and blood pressure control is recommended for most patients with type B IMH (TBIMH).[8-10] Accepted indications for emergent thoracic endovascular aortic repair (TEVAR) are impending aortic rupture and end-organ malperfusion. Elective endovascular repair is recommended for aneurysmal degeneration of the descending thoracic aorta of at least 55 mm or growth of at least 10 mm within a year.[11,12] These recommendations, however, derive from experience with and research of patients with type B aortic dissection rather than TBIMH. There is no standardization of what constitutes complicated TBIMH. Our study sought to determine the outcomes of patients treated initially with best medical therapy (BMT) and the risk factors associated with BMT failure and need for surgical intervention.

METHODS

The Eastern Virginia Medical School Institutional Review Board approved the electronic medical record review and waiver of informed consent in compliance with the Health Insurance Portability and Accountability Act. We retrospectively reviewed medical records of all patients with type B aortic IMH managed at our medical

From the Division of Vascular Surgery, Eastern Virginia Medical School.

Author conflict of interest: J.M.P. receives consultant fees from Terumo Aortic, Cook Medical, Medtronic, and W. L. Gore; he is on the speakers bureau of Terumo Aortic, Medtronic Inc, and Philips Volcano and the advisory board of Medtronic Inc, W. L. Gore, and Mellon Medical.

Presented at the Forty-third Annual Meeting of the Southern Association for Vascular Surgery, Boca Raton, Fla, January 23-26, 2019; recipient of the S. Timothy String Presidential Award.

Correspondence: Jean M. Panneton, MD, Eastern Virginia Medical School, Division of Vascular Surgery, Sentara Heart Hospital, 600 Gresham Dr, Ste 8620, Norfolk, VA 23507 (e-mail: pannetjm@evms.edu).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

0741-5214

Copyright © 2019 by the Society for Vascular Surgery. Published by Elsevier Inc.

https://doi.org/10.1016/j.jvs.2019.07.084

1088

ARTICLE HIGHLIGHTS

- **Type of Research:** Single-center, retrospective cohort study
- **Key Findings:** Medical therapy with systolic blood pressure control below 120 mm Hg and heart rate control in 92 patients with type B aortic intramural hematoma (IMH) was associated with a 71.6% failure rate. Failure within 14 days occurred in 50.6% of the patients. Presenting IMH thickness >8.0 mm was an independent risk factor to predict medical therapy failure.
- **Take Home Message:** Medical therapy in type B aortic IMH with presenting thickness >8.0 mm is associated with high failure rate and need for endovascular repair.

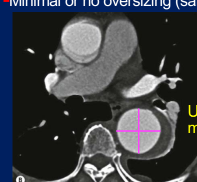
"**BMT** for TB IMH is associated with a high failure rate and need for interventions. <u>IMH thickness on admission</u> is the most reliable factor to predict failure of BMT."

TEVAR Strategies for IMH

- Technically Straightforward
- Only 1 lumen to deal with
- ***Majority of experts favor endograft coverage of full DTA***

TEVAR Strategies for IMH

- Land proximally in healthy aorta (same as TBAD)
- Minimal or no oversizing (same as AD)



Use lumen inner-to-inner (ITI) measurements for graft sizing

IMH Summary: This much we know

- Relatively uncommon
- Identical clinical presentation to acute TBAD
- Complication potential greater than TBAD
- <u>Medical Rx best for uncomplicated/asymptomatic IMH</u>
- TEVAR is now accepted as the intervention of choice

IMH Summary: Continuing Uncertainties

- Precise pathogenesis remains unclear
- Indications for intervention undefined in the absence of complications
- Extent of aortic coverage (*fear of paraplegia*)

IMH Summary: Continuing Uncertainties

We face a persistent absence of
robust evidence on IMH-specific outcomes

THANK YOU!