Best medical therapy for uncomplicated Type B dissections – is it enough?

Santi Trimarchi, MD, PhD

Associate Professor of Vascular Surgery, University of Milan
Head, Unit of Vascular Surgery II°
Director, Thoracic Aortic Research Center
IRCCS Policlinico San Donato
Disclosures

**Grants:**  Italian National Research Council (CNR), CARIPLO Foundation, San Donato Foundation, Gore WL, Medtronic inc.

**Consultant and Speaker:**  Gore WL, Medtronic inc.
Uncomplicated Type B Dissection

45 - 55%

IRAD
Uncomplicated Type B Dissection: TEVAR vs BMT

Aortic progression with OMT @ 5 yrs: 46%
**Uncomplicated Type B Dissection: TEVAR vs BMT**

Acute uncomplicated type B dissections randomized: BMT vs. TEVAR

- No/Incomplete false lumen thrombosis
  - 13 (43%) TEVAR vs. 30 (97%) BMT (p < .001)
- TL increase after TEVAR vs. no change BMT
- FL reduction in the TEVAR group vs. FL increase in BMT group
8.6.1.6. Recommendations for Definitive Management

Class I

3. Acute thoracic aortic dissection involving the descending aorta should be managed medically unless life-threatening complications develop (eg, malperfusion syndrome, progression of dissection, enlarging aneurysm, inability to control blood pressure or symptoms).285,288,334–337 (Level of Evidence: B)
Uncomplicated Type B Dissection: BMT

8.6.1.6. Recommendations for Definitive Management

Class I

3. Acute thoracic aortic dissection involving the descending aorta should be managed medically unless life-threatening complications develop (eg, malperfusion syndrome, progression of dissection, enlarging aneurysm, inability to control blood pressure or symptoms). 285, 288, 334–337 (Level of Evidence: B)

| Recommendations                               | Class | Level  
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<tr>
<td>In uncomplicated Type B AD, medical therapy should always be recommended.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>In uncomplicated Type B AD, TEVAR should be considered.</td>
<td>IIa</td>
<td>B</td>
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</tbody>
</table>
Uncomplicated Type B Dissection: Increased Aortic Complications

- In-hospital mortality

- Predictors of Aortic Growth
Uncomplicated Type B Dissection: In-H mortality/compl.

1-10% in-hospital mortality

Aortic Rupture
Sudden Malperfusion

IRAD. Circulation 2006
Uncomplicated Type B Dissection: In-H mortality/compl.

- Recurrent / Rafractory Pain and Hypertension

![Bar graph showing In-hospital mortality after medical management.

In-hospital mortality after medical management.

Importance of Refractory Pain and Hypertension in Acute Type B Aortic Dissection: Insights From the International Registry of Acute Aortic Dissection (IRAD)


_Circulation_ 2010;122;1283-1289; originally published online Sep 13, 2010;
Uncomplicated Type B Dissection: In-H mortality/compl.

• Location of Proximal Entry Tear

Conclusions. A primary entry tear at the concavity of the distal aortic arch is associated with a significant increase of the occurrence of complicated acute type B

A New Mechanism by Which an Acute Type B Aortic Dissection Is Primarily Complicated, Becomes Complicated, or Remains Uncomplicated

Christian Loewe, MD,* Martin Czerny, MD, MBA,* Gottfried H. Sodeck, MD, Julie Ta, MS, Maria Schoder, MD, Martin Funovics, MD, Julia Dumfarth, MD, Marek Ehrlich, MD, Michael Grimm, MD, and Johannes Lammer, MD

Departments of Cardiovascular and Interventional Radiology, Emergency Medicine, and Cardiac Surgery, Medical University of Vienna, Vienna, Austria; Department of Cardiovascular Surgery, University Hospital Bern, Bern, Switzerland; and Department of Cardiac Surgery, Medical University of Innsbruck, Innsbruck, Austria.

Predictors of Late Aortic Growth
Predictors of Late Aortic Growth

• Diameter of Proximal Entry Tear

CONCLUSIONS:
..... a large entry tear located in the proximal part of the dissection identifies a high-risk subgroup of patients who may benefit from earlier and more aggressive therapy.

Long-Term Outcome of Aortic Dissection With Patent False Lumen
Predictive Role of Entry Tear Size and Location
Artur Evangelista, MD, PhD; Armando Salas, MD; Aida Ribera, PhD; Ignacio Ferrer-González, MD, PhD; Hug Cuellar, MD; Victor Pineda, MD; Teresa González-Alujas, MD, PhD; Bart Bijnens, PhD; Gaseta Pernanyer-Miralda, MD, PhD; David Garcia-Dorado, MD, PhD
(Circulation. 2012;125:3133-3141.)
Predictors of Late Aortic Growth

- Number of Entry Tears

Number of Entry Tears Is Associated With Aortic Growth in Type B Dissections

Jip L. Tolenaar, MD, Jasper W. van Keulen, MD, PhD, Frederik H.W. Jonker, MD, PhD, Joost A. van Herwaarden, MD, PhD, Hence J.M. Verhagen, MD, PhD, Frans L. Moll, MD, PhD, and Bart E. Muhs, MD, PhD

Thoracic Aortic Research Center, Policlinico San Donato Istituto di Ricovero e Cura a Carattere Scientifico, Milan, Italy; Section of Vascular Surgery, Yale University School of Medicine, New Haven, Connecticut; Department of Vascular Surgery, University Medical Center Utrecht, Utrecht, the Netherlands and Department of Vascular Surgery, Erasmus Medical Center, Rotterdam, the Netherlands

Predictors of Late Aortic Growth

• Circular shape FL

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<th>Variable</th>
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<td>Age</td>
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Morphologic predictors of aortic dilatation in type B aortic dissection

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(J Vasc Surg 2013;58:1220-5.)
Predictors of Late Aortic Growth

- Partial Lumen Thrombosis

**CONCLUSIONS**
Mortality is high after discharge from the hospital among patients with type B acute aortic dissection. Partial thrombosis of the false lumen, as compared with complete patency, is a significant independent predictor of postdischarge mortality in these patients.

Partial Thrombosis of the False Lumen in Patients with Acute Type B Aortic Dissection

Thomas T. Tsai, M.D., M.Sc., Arturo Evangelista, M.D., Christoph A. Nienaber, M.D., Truls Myrmel, M.D., Gabriel Meinhardt, M.D., Jeanna V. Cooper, M.S., Dean E. Smith, Ph.D., Toru Suzuki, M.D., Rossella Fattori, M.D., Alfredo Llovet, M.D., James Froehlich, M.D., Stuart Hutchison, M.D., Alessandro Distante, M.D., Thoralf Sundt, M.D., Joshua Beckman, M.D., James L. Januzzi, Jr., M.D., Eric M. Isselbacher, M.D., and Kim A. Eagle, M.D., for the International Registry of Acute Aortic Dissection.

Predictors of Late Aortic Growth

• Partial Lumen Thrombosis

CONCLUSIONS
The aortic growth rate among patients with ABAD with a partially thrombosed false lumen seemed to be higher during follow-up than in patients with complete thrombosis or a patent false lumen. Therefore, patients with partial thrombosis should be monitored more frequently.

Importance of false lumen thrombosis in type B aortic dissection prognosis

Santi Trimarchi, MD, PhD, a Jip L. Tolenaar, MD, a Frederik H. W. Jonker, MD, PhD, b Brian Murray, MD, c Thomas T. Tsai, MD, d Kim A. Eagle, MD, e Vincenzo Rampoldi, MD, e Hence J. M. Verhagen, MD, PhD, e Joost A. van Herwaarden, MD, PhD, e Frans L. Moll, MD, PhD, e Bart E. Muhs, MD, PhD, e and John A. Elefteriades, MD e

(J Thorac Cardiovasc Surg 2013;145:S208-12)
Predictors of Late Aortic Growth

- Partial Lumen Thrombosis

| TABLE 1. Mean Initial Diameter, Final Diameter, and Growth Rate of the 177 Segments |
|---------------------------------|-------------------------------|-----------------|
|                                 | Initial Diameter (mm) | Final Diameter (mm) | Growth Rate (mm/year) |
| Aortic arch (n=48)             | 39.4±7.7               | 45.6±11.0         | 2.2±6.9               |
| Descending aorta (n=62)        | 37.7±9.3               | 45.0±13.0         | 2.2±10.1              |
| Suprarenal abdominal aorta (n=38) | 29.6±5.3           | 33.3±5.9          | 1.0±5.8               |
| Infrarenal abdominal aorta (n=19) | 29.7±4.7            | 26.8±5.8          | 1.0±2.2               |
| Iliac artery (n=10)            | 17.5±4.8               | 18.8±3.9          | -0.4±4.7              |

Growth Rate of Aortic Diameter in Patients With Type B Aortic Dissection During the Chronic Phase

Eijun Suyoshi, MD; Ichiro Sakamoto, MD; Kuniaki Hayashi, MD; Tetsuji Yamaguchi, MD; Tatuya Inada, MD

*Circulation* 2004;110[suppl
Predictors of Late Aortic Growth

- Partial Lumen Thrombosis

273 aortic segments, expansion:

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<tr>
<td>PT</td>
<td>102/125 (81.6%)</td>
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<tr>
<td>PLT</td>
<td>98/125 (78.4%)</td>
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<td>CT</td>
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(J Thorac Cardiovasc Surg 2013;145:S208-12)
Predictors of Late Aortic Growth

- Saccular FL formation

A careful follow-up study is needed whenever the sac formation type of partially closed false lumen is identified.

Growth Rate of Affected Aorta in Patients With Type B Partially Closed Aortic Dissection

Eijun Sueyoshi, MD, Ichiro Sakamoto, MD, and Masataka Uetani, MD
Department of Radiology, Nagasaki University School of Medicine, Nagasaki, Japan

Predictors of Late Aortic Growth

- Saccular FL formation

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(J Vasc Surg 2013;58:1220-5.)
Predictors of Late Aortic Growth

• Aortic diameter

Total initial diameter > 40 mm

F L > 22 mm
Predictors of Late Aortic Growth

- Aortic diameter
Uncomplicated B Dissection: Recent Observations
Uncomplicated Type B Dissection: BMT

**Conclusions:** The majority of patients with acute type B dissection will fail medical therapy over time as evidenced by a 6-year intervention-free survival of 41%.

The natural history of medically managed acute type B aortic dissection

Christopher A. Durham, MD, Richard P. Cambria, MD, Linda J. Wang, MD, Erol A. Ergin, MS, Nathan J. Aramson, MD, Vircedra I. Patel, MD, MPH, and Mark F. Coenrad, MD, MSSc, Boston, Mass

(J Vasc Surg 2015;61:1192-9.)
Uncomplicated Type B Dissection: BMT

![Graph showing survival over time](image)

**Intervention:**
- At risk: 87
- Survival: 100.0
- SE(95%): 0.0

**Medically Managed:**
- At risk: 211
- Survival: 100.0
- SE(95%): 0.0

**Conclusions:**

Patients who underwent any aortic intervention had a significant survival advantage over those who were treated with medical management alone.

The natural history of medically managed acute type B aortic dissection

Uncomplicated Type B Dissection: In-H mortality/compl.

• 12.6% initially uncomplicated B patients developed in-hospital complications

IRAD unpublished data
Uncomplicated Type B Dissection: In-H mortality/compl.

- 12.6% initially uncomplicated B patients developed in-hospital complications
  
  - extension of dissection (39.7%)
  - hypotension (23.8%)
  - rupture (17.5%)
  - limb ischemia (15.9%)
  - CVA (3.2%)

IRAD unpublished data
Uncomplicated Type B Dissection: Trend in Management

IRAD 1996-2013: 17 yrs experience
Trends in Management

Presentation, Diagnosis, and Outcomes of Acute Aortic Dissection
17-Year Trends From the International Registry of Acute Aortic Dissection

Linda A. Pape, MD,1 Mazen Awaia, MD,2 Elise M. Womicki, BS,1 Tomo Suzuki, MD, PhD,3 Santii Trimarchi, MD, PhD,1 Arturo Evangelista, MD,4 Truls Myrmel, MD, PhD,5 Mogens Larsen, MD,6 Kevin M. Harris, MD,7 Kevin Greason, MD,5 Marco Di Eusanio, MD, PhD,5 Eduardo Bosconi, MD, PhD,5 Daniel G. Montgomery, BS,4 Kim A. Eagle, MD,5 Christoph A. Nienaber, MD,6,7 Eric M. Isselbacher, MD,8,9 Patrick O’Gara, MD,9
Uncomplicated Type B Dissection: Outcome

- Uncomplicated OMT mortality 6.4% (TEVAR 10.2% - Open 17.5)
Uncomplicated Type B Dissection: Outcome

• Serious complications can occur after TEVAR, such as endoleaks, retrograde type A dissection and conversion to open surgery

Outcome of patients suffering from acute type B aortic dissection: a retrospective single-centre analysis of 135 consecutive patients.
Garbade J, Jendrichs M, Borger MA, Barten MJ, Scheinert D, GUTBERLET M, Walther T, Mehr FW.

Endovascular repair or medical treatment of acute type B aortic dissection? A comparison.
# Uncomplicated Type B Dissection: Demographic

## Table 1. Demographics and Patient History of All Patients With Type B Aortic Dissection

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<thead>
<tr>
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<th>In-Hospital</th>
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<tr>
<td></td>
<td>Number</td>
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<td>Died</td>
<td>Odds Ratio</td>
<td>P Value</td>
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<tr>
<td>History</td>
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<td>1.42 (1.22–1.82)</td>
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Predicting In-Hospital Mortality in Acute Type B Aortic Dissection
Evidence From International Registry of Acute Aortic Dissection

Jip L. Tolenaar, MD, PhD; Whit Froehlich; Frederik H.W. Jonker, MD, PhD; Gilbert R. Upchurch Jr, MD; Vincenzo Ranzini, MD; Thomas T. Tsai, MD, MSc; Eduardo Bosson, MD, PhD; Arturo Evangelista, MD; Patrick O’Gara, MD; Linda Pape, MD; Dan Montgomery; Eric M. Isselbacher, MD; Christoph A. Nienaber, MD; Kim A. Eagle, MD; Santi Trimarchi, MD, PhD

Circulation. 2014;130[suppl 1]:S45-S50.
6 yrs FU

- Positive aortic remodelling
Uncomplicated Type B Dissection: Observation

5 yrs FU

2010

2015
Uncomplicated Type B Dissection: Observation

5 yrs FU

2010

2015
**Uncomplicated Type B Dissection: Medical Therapy**

**Beta-Blockers:** improve outcome in ALL patients and in **A-type AD** patients

**Ca-Channel-Blockers:** improve outcome selectively in **B-type AD** patients

---

Type-Selective Benefits of Medications in Treatment of Acute Aortic Dissection (from the International Registry of Acute Aortic Dissection [IRAD])

Toru Suzuki, MD**, Eric M. Isselbacher, MD, Christoph A. Nienaber, MD, Reed E. Pyeritz, MD, Kim A. Eagle, MD, Thomas T. Tsai, MD, Jeanne V. Cooper, MS, James L. Januzzi, Jr., MD, Alan C. Braverman, MD, Daniel G. Montgomery, BS, Rossella Fattori, MD, Linda Pape, MD, Kevin M. Harris, MD, Anna Booher, MD, Jae K. Oh, MD, Mark Peterson, MD, Vijay S. Ramanath, MD**, and James B. Proehlch, MD

*Am J Cardiol* 2012; 109:122-129
Uncomplicated Type B Dissection: Medical Therapy

**Beta-Blockers:** improve outcome in ALL patients and in **A-type AD** patients

**Ca-Channel-Blockers:** improve outcome selectively in **B-type AD** patients
Uncomplicated Type B Dissection: Discussion

- Overall B dissections = 100 pts

<table>
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<tr>
<th>Complicated</th>
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<th>IRAD</th>
<th>Uncomplicated</th>
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<td>«</td>
<td>51 «</td>
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<td>«</td>
<td>80 «</td>
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<td>In-H Compl.10-13% (about 6 pts) = 49</td>
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<td>INSTED XL</td>
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<td>L-T Dilat. 46% (about 23 pts) = 26</td>
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<td>MGH</td>
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<tr>
<td>L-T Dilat. 59% (about 29 pts) = 20</td>
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1/4° to 1/5° of pts seem do not dilatate overtime
Conclusions

Best medical therapy for uncomplicated Type B dissections – is it enough?
Best medical therapy for uncomplicated Type B dissections – is it enough?

Probably NOT
Conclusions

- Tailored therapy for B dissection
Conclusions

- Tailored therapy for B dissection
Trials in Aortic Dissections: Future Perspectives

• Registry-Based Trial, INTACT-AD

INternational TransAtlantic Cooperative Trial – on Aortic Dissection

• PRCT

Un. Texas Houston + UPMC
Best medical therapy for uncomplicated Type B dissections – is it enough?

Santi Trimarchi, MD, PhD

Associate Professor of Vascular Surgery, University of Milan
Head, Unit of Vascular Surgery II°
Director, Thoracic Aortic Research Center
IRCCS Policlinico San Donato