

## Introduction

- Acute Type A aortic dissection (ATAAD) is a morbid condition with a mortality rate of 23.8% that requires emergent diagnosis and surgical treatment.<sup>1,2</sup>
- Presence of mesenteric malperfusion in ATAAD is often difficult to diagnose, and controversy over treatment strategies may contribute to the higher mortality rate (63.2%) and poor patient outcomes.<sup>1,2</sup>
- Gold standard for ATAAD treatment has been open proximal aortic repair by cardiac surgeons.
- Endovascular techniques, such as thoracic endovascular aortic repair (TEVAR)<sup>1,3</sup>, aortic fenestrations<sup>1,4</sup>, and branch vessel stenting,<sup>1</sup> have been described for treatment of malperfusion by vascular surgeons before proximal aortic repair.
- More information is needed to stratify ATAAD patients for appropriate treatment based on preoperative evaluation.

## Objectives

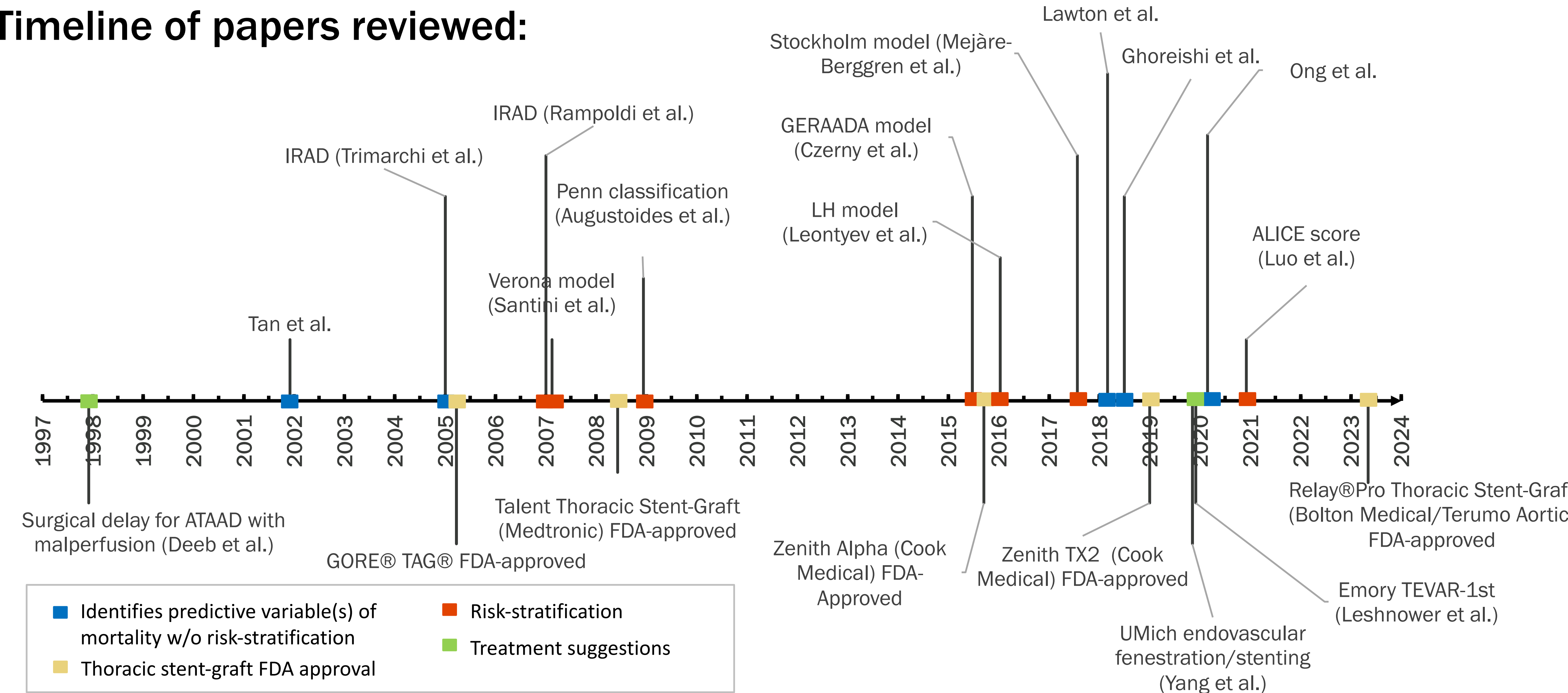
- We review predictive variables of in-hospital mortality in ATAAD patients.
- We define cardiac-complicated and vascular-complicated ATAAD, and we identify clinical, laboratory, and radiographic findings for this classification.

## Methods

- A search was performed using the electronic database PubMed with the following terms:
  - Type A Dissection
  - Complications
  - Malperfusion
  - Clinical presentation
  - Laboratory
  - Imaging
- Papers that were selected:
  - Demonstrated statistically significant risk factors of in-hospital mortality in ATAAD repair
  - Described preoperative risk-scoring systems
  - Contributed to the definition of complicated ATAAD

## Results

### Timeline of papers reviewed:



### Models of In-Hospital Mortality

- Significant predictors of in-hospital mortality were identified via uni- and multivariate analysis.
- Risk-stratification scoring systems were created from logistic regression in the following papers:
  - International Registry of Acute Aortic Dissection (IRAD) (Rampoldi et al.)
  - Verona Model (Santini et al.)
  - Penn Classification (Augustoides et al.)
  - GERAADA model (Czerny et al.)
  - Leipzig-Halifax (LH) Model (Leontyev et al.)
  - Stockholm model (Mejåre-Berggren et al.)
  - ALICE score (Luo et al.)
- Recurring variables included in the various scoring systems (number of times included):
  - Mesenteric MPS (5)
  - Coronary MPS (4)
  - Cardiac tamponade (4)
  - Renal dysfunction (4)
  - Age (3)
  - Hypotension or shock (3)
  - Limb ischemia (3)
  - Neurologic deficit (3)
  - Pulse deficit (3)

### Defining Complicated ATAAD

	Clinical	Laboratory	Imaging
Cardiac-complicated	Hypotension	Abnormal ECG	Abnormal TTE (e.g., aortic rupture, aortic insufficiency, pericardial tamponade)
	Syncopal	Elevated troponin	
	Intractable chest pain		
Vascular-complicated	Abdominal pain	Elevated lactate	Abnormal CTA (e.g., mesenteric malperfusion)
	Nausea	Base-deficit	
	Absence of peripheral pulses	Elevated creatinine	

**Table 1. Features of complicated ATAAD.** Cardiac-complicated ATAAD is associated with aortic valve insufficiency, aortic rupture, pericardial tamponade, and/or coronary malperfusion (i.e., abnormal ECG). Vascular-complicated ATAAD is associated with mesenteric ischemia. Abbreviations: electrocardiogram, ECG; chest x-ray, CXR; transthoracic echocardiogram, TTE; computed tomography angiogram, CTA.

## Conclusions

- 12 articles published between 2003 and 2021 describing preoperative variables predictive of in-hospital mortality in ATAAD repair were reviewed.
- 7 articles described preoperative risk-scoring systems for stratifying ATAAD patients undergoing surgery.
- Recurrent significant variables included in the risk-scoring systems are identified.
- We define cardiac- or vascular-complicated categories based on a combination of clinical, laboratory, and imaging criteria.
- We propose this classification to guide the timely and appropriate treatment of ATAAD, whether that involves an immediate proximal repair by cardiothoracic surgery and/or initial treatment of mesenteric ischemia followed by the Type A repair.
- A limitation of this study is the lack of quantitative comparison methods between the different studies, as there is a high level of heterogeneity in the existing literature regarding definitions, preoperative variables evaluated, and statistics reported.

## Future Directions

- Create a scoring system to further define cardiac vs. vascular-complicated ATAAD.
- Internal validation of retrospective data with our criteria.
- External validation with other institutions through the IRAD or Vascular Low Frequency Disease Consortium.

## References

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