

Case Conference

2012/12/20
PGY洪珮茹/ VS李尚

Patient Profile

- Age/Sex: 76 y/o Female
- Date : Day1 15:34
- 入院方式：步行
- 檢傷C.C.: 心因性胸悶、胸痛 (?)
- GCS:E4V5M6
- T/P/R: 36.7/88/22 BP:116/90 SpO2: 97%
- Triage II

Chief Complaint

- Chest discomfort since 9AM

Present Illness

- Epigastralgia and upper chest pain since 9AM
- Vomiting once, no diarrhea
- Dizziness, no headache
- No trauma
- No cough, no rhinorrhea
- 因為家中無人，自訴躺在地上，打電話請兒子回家

Past History

Hypertension with medication control
No DM , No CAD history
Allergy : denied
Abdominal operation history : denied

Physical examination

Conscious: clear 、 alert
H&N: supple 、 no icteric sclera 、 no jaundice
Chest: clear breathing sound
Heart: regular heart beat
Abdomen: soft 、 normal active bowel sounds
epigastric tenderness 、 Murphy's sign (+)
Extremities: warm, freely movable
Neurology: MP all 5



Tentative Diagnosis

- Suspect GB stone with cholecystitis

Order

15:40 NPO
IVF 0.9%NS run 80ml/hr
CBC/DC/PLT
PT/aPTT
Cr/AST/Na/K/T-bil/Tro-I
CXR/KUB
primperon 1amp iv st
keto 1 amp im st (VAS 8)

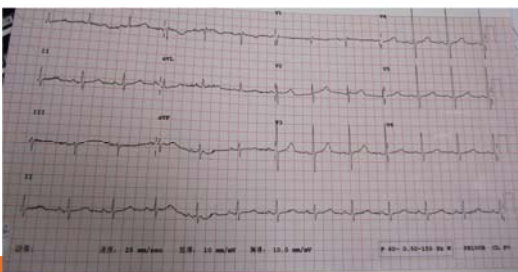
CXR



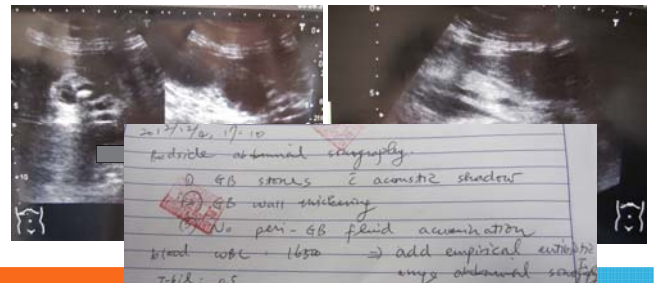
KUB



EKG



BEDSIDE ECHO



WBC	16.5	X1000/uL
RBC	4.24	million
Hb	13.0	gm/dl
Ht	40.1	%
MCV	94.6	fl
MCH	30.7	pg
MCHC	32.4	%
RDW	14.7	%
Platelet	185	x1000/uL
Differential count	*****	
Segmented Neutro.	79.5	%
Lymphocyte	9.5	%
Monocyte	10.0	%
Eosinophil	0.0	%
Basophil	0.0	%
Atypical lymphocyte	0.5	%
Band	0.5	%
Metamyelocyte	0.0	%
Myelocyte	0.0	%
Promyelocyte	0.0	%
Elast	0.0	%

Laboratory Data 16:59

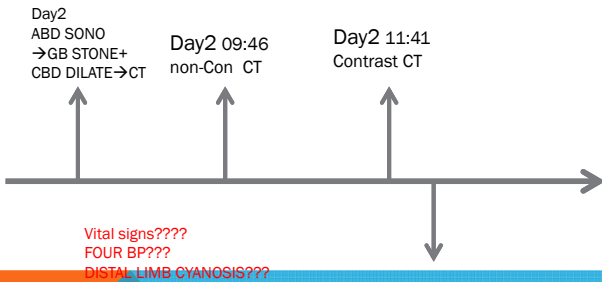
PT	10.0
Normal control	10.5
INR	0.95
APTT	22.3
Normal control	32.8
GOT(AST)	125
T-Bilirubin	0.5
Creatinine	1.6
eGFR	31.34
Na	146
K	5.1
Troponin I	0.127
GPT(ALT)	80
Troponin I	0.148

ER course

- 17:22
- arrange abd sonography CM
- Cefmetazole 1.0g iv q8h
- 轉EC
- f/u Tro-I GPT at 22:00
- 22:37

GPT(ALT)	80
Troponin I	0.148

ER course



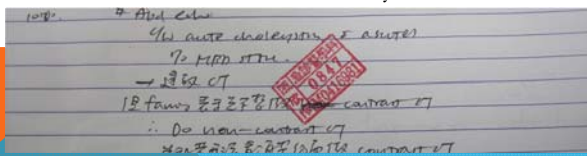
Consult CVS and GS
For emergency surgery
Day 2 13:45~22:20
Admitted to SICU S/P OP

ABD ECHO

- Diagnosis :
- Gallbladder :
Stone, C/W Acute calculous cholecystitis,
- Biliary Tract :
Dilatation of main bile duct,
- Others : Ascites
- Comment :
CT scan is considered

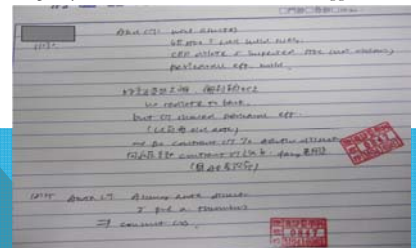
NON-CONTRAST CT

- Impression :
- Calculous cholecystitis is considered.
- Suspect distal CBD obstruction with upstream dilatation, suggest correlat with ERCP.
- Hyperdense pericardial collection, DDx:
hemopericardium or prior infection, suggest clinical correlation and F/U study.



CONTRAST-CT

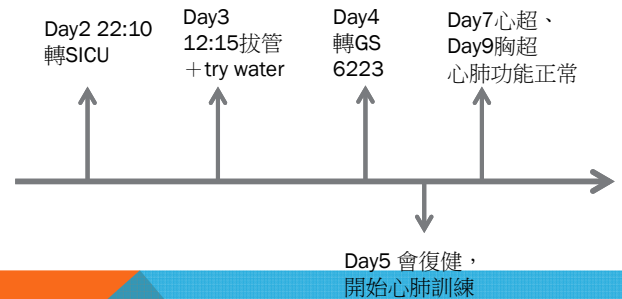
- Impression :
- Type A aortic dissection complicated with hemomediastinum and hemopericardium, resulting in right artery compromise.
- Faint GGO and peribronchial thickening in RUL.
- A small nodular opacity with minimal cavitation at LUL, suggest image F/U.



Op-finding

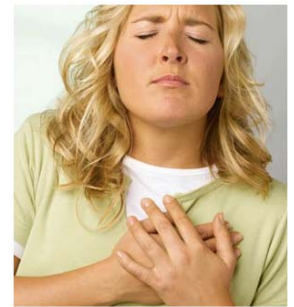
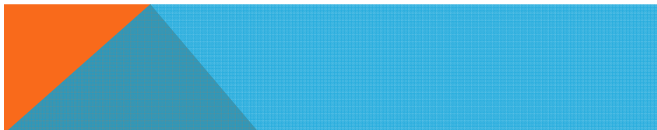


SICU & ward COURSE



Final diagnosis

- Stanford type A acute aortic dissection s/p partial David procedure
- Calculus cholecystitis with CBD stone s/p cholecystectomy and CBD exploration
- HTN under medication control



Discussion

Acute aortic dissection

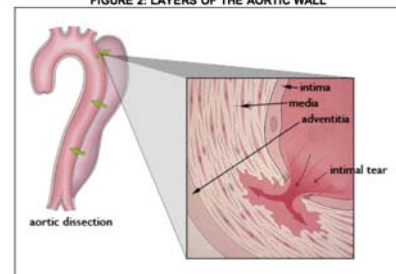
INTRODUCTION

- An aortic dissection is a tear in the wall of the aorta that allows blood to flow within the layers of the aorta.
- Early and accurate diagnosis and treatment are crucial for survival.



PATHOPHYSIOLOGY

FIGURE 2: LAYERS OF THE AORTIC WALL



INCIDENCE

- The incidence of acute aortic dissection in the general population is estimated to range from **2.6 to 3.5** per 100,000 person-years [3-5]. Patients with acute aortic dissection tend to be **60- to 80-year-old men** [1,6,7].
- In a review of **464 patients** from the International Registry of Acute Aortic Dissection (IRAD), **65 percent** were men and the mean age was **63 years** [7]. **Women** presenting with aortic dissection tend to be **older than men (67 versus 60 years)** [8].



Risk factors

- The most important predisposing factor for acute aortic dissection is **systemic hypertension** [1,6,7].
- In the IRAD registry data, **72 percent** had a history of hypertension [7]. In addition, **31 percent** had a history of **atherosclerosis**. These factors are **less important in young patients**; in an IRAD analysis of patients under age 40, only 34 percent had a history of hypertension and only 1 percent had a history of atherosclerosis [9].



TYPES OF AORTIC DISSECTION

- **Stanford Classification system**
 - A - Originated and involves ascending aorta.
 - B - Originated and involves descending aorta
- **DeBaKey Classification:**
 - Type I - originated in ascending aorta
 - Type II - originated in and is confined to ascending aorta
 - Type III - originated in descending aorta
- **Ascending is twice often than descending**



CLINICAL MANIFESTATIONS

- Patients with an aortic dissection typically present with **severe, sharp or "tearing" posterior chest or back pain** (in dissection distal to the left subclavian) or **anterior chest pain** (in ascending aortic dissection)
- **Symptoms been associated with aortic dissections:**
 - Sudden onset chest pain
 - Fainting
 - Limb pain, numbness, or weakness
 - Shortness of Breath
 - Anxiety
 - Neck or Jaw pain
 - Groin or back pain



- In the IRAD review, **73 percent** of patients presented with **chest pain** that was typically **abrupt in onset** and was more often **sharp** than tearing [7].
- **Chest pain** was significantly more common in patients with **type A dissections** (79 versus 63 percent in type B dissections), while both **back pain** (64 versus 47 percent) and **abdominal pain** (43 versus 22 percent) were significantly more common with **type B** dissections.



- **Painless dissection** has been reported, but is relatively uncommon. In an analysis from the IRAD registry of 977 patients, **only 63 (6.4 percent) had no pain** [31].
- Patients with **painless dissection** were **older (mean age 67 versus 62 years)** and more often had a **type A** dissection (75 versus 61 percent).



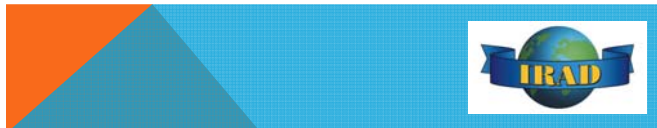
- A **prior history** of diabetes, aortic aneurysm, or cardiovascular surgery was more common in patients with painless dissection. Presenting symptoms of **syncope, heart failure, or stroke** were seen more often in this group.
- **In-hospital mortality** was significantly **higher** than for patients presenting with pain (33 versus 23 percent).



- In one study, up to **10 percent** of patients presented with neurologic symptoms, but without chest pain [32]. **Syncope** during aortic dissection is associated with **worse outcomes**. Almost all had a proximal (Stanford type A) dissection and, compared with the patients presenting with other symptoms, there was an increased incidence of cardiac tamponade and stroke, conditions that are more likely to produce syncope.



- A pulse deficit has been described in **19 to 30 percent** of patients with an **acute type A** dissection [7,34] compared with **9 to 21 percent** with a **type B** dissection [7,35]. These patients have a **higher rate of in-hospital complications and mortality than those without a pulse deficit** [34]. **Women are less likely to have a pulse deficit than men** [8].



DIAGNOSIS

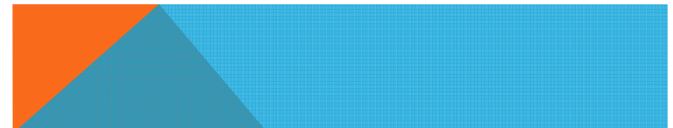
ORIGINAL INVESTIGATION

Clinical Prediction of Acute Aortic Dissection

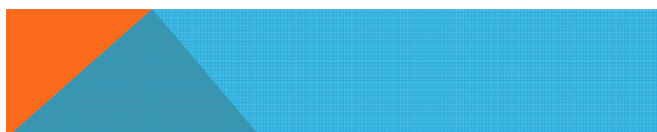
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- **250** patients with acute chest pain, back pain, or both; absence of an established differential diagnosis of the pain syndrome; and clinical suspicion of acute aortic dissection were evaluated for the presence of 26 clinical variables in a **prospective, observational study**. Multivariate analysis was performed to create a prediction model of aortic dissection.

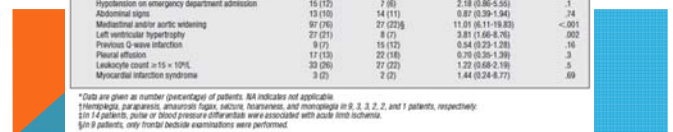


- **Aortic dissection is generally suspected from the history and physical examination.**

Table 2. Univariate Analysis of Signs and Symptoms Associated With Types A and B Acute Aortic Dissection*

Variable	Dissection (n = 128)	No Dissection (n = 122)	Odds Ratio (95% Confidence Interval)	P
History of pain				
Inevitable onset of pain	101 (78)	37 (30)	8.58 (4.84-15.26)	<.001
Trigger of pain	19 (15)	28 (23)	0.59 (0.31-1.12)	.1
Prodromal symptoms	13 (10)	15 (12)	0.87 (0.37-1.77)	.89
Intense severity of pain	110 (86)	62 (51)	5.92 (2.79-9.26)	<.001
Tearing or ripping pain	79 (62)	7 (6)	26.49 (11.41-61.48)	<.001
Migratory pain	66 (44)	7 (6)	12.76 (5.52-29.57)	<.001
Pleurotic pain	12 (9)	21 (17)	0.59 (0.29-1.18)	.07
Posterior chest or lower back pain	64 (50)	31 (25)	2.94 (1.77-5.01)	<.001
Pain in neck or jaw and/or >1 extremity	34 (27)	14 (11)	2.79 (1.41-5.51)	.003
Abdominal pain	28 (22)	14 (11)	2.16 (1.08-4.34)	.03
Anterior chest pain	87 (68)	85 (70)	1.36 (0.78-2.38)	.28
Neurologic manifestations				
Focal neurologic signs	17 (13)	0	NA	<.001
Syncope	13 (10)	12 (10)	1.94 (0.49-2.37)	.83
Prolonged loss of consciousness or coma	3 (2)	2 (2)	1.44 (0.24-8.77)	.89
Physical examination, chest radiograph, electrocardiographic				
Chest and laboratory findings				
Pulse and/or blood pressure differentials	49 (38)	1 (1)	75.05 (15.16-454.6)	<.001
Acute aortic failure	20 (16)	0	NA	<.001
Murmur of aortic regurgitation	31 (24)	29 (24)	2.12 (1.23-3.67)	.007
Hypertension on emergency department admission	33 (26)	38 (31)	1.56 (0.92-2.63)	.09
Hypertension on emergency department admission	15 (12)	7 (6)	2.18 (0.86-5.65)	.1
Abdominal signs	13 (10)	14 (11)	0.87 (0.39-1.94)	.74
Mediastinal and/or aortic widening	87 (68)	27 (22)	11.01 (6.11-19.83)	<.001
Left ventricular hypertrophy	27 (21)	8 (7)	3.81 (1.66-8.76)	.002
Prolonged Q-wave infarction	9 (7)	15 (12)	0.54 (0.23-1.28)	.16
Pleural effusion	17 (13)	22 (18)	0.70 (0.36-1.39)	.3
Leukocyte count >15 × 10 ⁹ /L	33 (26)	27 (22)	1.22 (0.68-2.19)	.5
Myocardial infarction syndrome	3 (2)	2 (2)	1.44 (0.24-8.77)	.89

*Data are given as number (percentage) of patients. Not indicated not applicable. †Hemoptysis, purpura, anisocoria, nystagmus, and tachycardia. ‡In 3, 3, 2, 2, and 1 patients, respectively. §In 14 patients, pulse or blood pressure differentials were associated with acute limb ischemia. ¶In 8 patients, only frontal bedside examinations were performed.



- Among **250 patients** with acute chest and/or back pain (**128 with a dissection**) found that **96 percent** of acute aortic dissections could be identified based upon some combination of the following three clinical features

- Abrupt onset of thoracic or abdominal pain with a sharp, tearing and/or ripping character
- Mediastinal and/or aortic widening on chest radiograph
- A variation in pulse (absence of a proximal extremity or carotid pulse) and/or blood pressure (>20 mmHg difference between the right and left arm)



The incidence
All three absent
Pain: 31 percent
Presence of chest
Variation in pulse
Any two out of three

Variable	No. (%) of Patients		Probability of Dissection, %
	Dissection (n = 128)	No Dissection (n = 122)	
No sign present	5 (4)	65 (53)	7
Aortic pain alone	13 (10)	29 (24)	31
Mediastinal widening, aortic widening, or both alone	11 (9)	17 (14)	39
Aortic pain + mediastinal widening, aortic widening, or both	50 (39)	10 (8)	83
Pulse differentials, blood pressure differentials, or both alone	2 (2)	0	100
Aortic pain + pulse differentials, blood pressure differentials, or both	11 (9)	1 (1)	92
Mediastinal widening + pulse differentials, blood pressure differentials, or both	2 (2)	0	100
Aortic pain + mediastinal widening, aortic widening, or both + pulse differentials, blood pressure differentials, or both	34 (27)	0	100

These three:
it



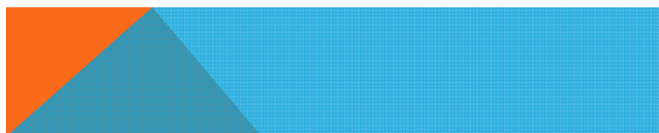
misdiagnosis

Factors leading to failure to diagnose acute aortic dissection in the emergency room

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misdiagnosis

- We examined a total of **109** emergency room (ER) patients who were ultimately diagnosed with AAD. **Misdiagnosis** of AAD was defined as failure to diagnose AAD at the end of the initial assessment in the ER.

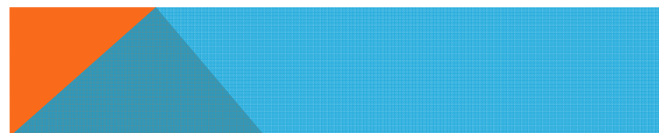


Table 2 Findings of blood test, chest radiography, and electrocardiography.

	Misdiagnosis group (n = 17)	Diagnosis group (n = 92)	p-Value
Blood sample test findings (n = 109)	n = 17	n = 92	
WBC count on admission (μl^{-1})	8700 ± 4600	9100 ± 3000	0.302
CRP (mg/dl)	2.0 ± 3.8	1.2 ± 3.7	0.161
CK (U/l)	165 ± 305	126 ± 121	0.432

Table 3 Diagnostic imaging tests at the initial assessment.

	Misdiagnosis group (n = 17)	Diagnosis group (n = 92)	p-Value
Imaging studies performed at the initial assessment			
CT (%)	7 (41%)	92 (100%)	<0.001
CT with contrast enhancement (%)	2 (12%)	92 (100%)	<0.001
Echocardiography (%)	7 (41%)	48 (52%)	0.405
MRI (%)	0 (0%)	1 (1%)	0.666
Aortography (%)	0 (0%)	0 (0%)	1.000
Number of imaging study per patient (mean ± standard deviation)	0.82 ± 0.81	1.53 ± 0.52	<0.001
CT, computed tomography; MRI, magnetic resonance imaging.			
T wave abnormality (%)	5 (31%)	33 (37%)	0.430
Any ST-T abnormalities (%)	7 (44%)	44 (49%)	0.788
Left ventricular hypertrophy (%)	7 (44%)	28 (31%)	0.247
Abnormal Q wave (%)	1 (6%)	7 (8%)	0.649

Continuous variables are expressed as mean ± standard deviation.
CRP, C-reactive protein; WBC, white blood cell; CK, creatine kinase; CKMB, creatine kinase MB subset.



misdiagnosis

Table 4 Univariate and multivariate logistic analysis for misdiagnosis.

	Univariate analysis		Multivariate analysis ^a	
	Odds ratio (95%CI)	p-Value	Odds ratio (95%CI)	p-Value
Walk-in patient	3.843 (1.101–13.407)	0.035	4.777 (1.267–18.007)	0.021
Anterior chest pain	3.411 (1.110–10.482)	0.032	3.465 (1.061–11.314)	0.040
Severe or worst ever pain	0.409 (0.143–1.168)	0.095		
Widened mediastinum	0.382 (0.123–1.187)	0.096		

CI, confidence interval.

^a Multivariate analysis of significant univariate predictors with a p-value < 0.10.

of admission (odds ratio 4.777; 95% confidence interval

Table 5 Clinical course and in-hospital outcome.

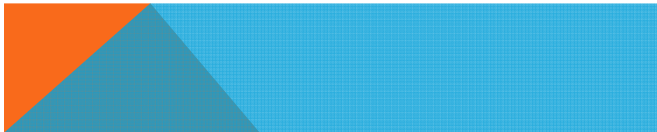
	Misdiagnosed patients N = 17	Diagnosed patients N = 92	p-Value
Time from onset to admission (h) median (interquartile range)	2.0 (4.0)	1.5 (2.0)	0.164
Time from admission to diagnosis (h) median (interquartile range)	25.0 (59.0)	1.0 (1.0)	<0.001
Urgent operation for aortic dissection (%)	5 (29%)	35 (38%)	0.349
In-hospital mortality rate (%)	3 (18%)	14 (15%)	0.520



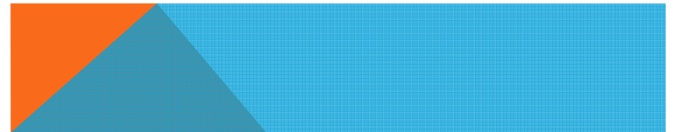
Physicians should be legally liable for missing an atypical aortic dissection: PRO.

Lebovits M.

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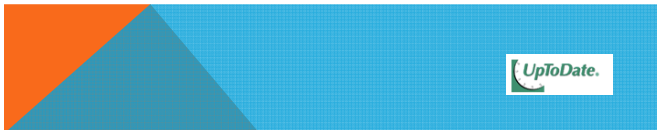


- Discussion of the potential legal exposure of a health care provider for the failure to diagnose and treat a medical condition is premised on multiple considerations. The questions asked before taking legal action are if the case has merit, if the harm was caused by the act of omission or commission, if the damages were suffered as a result of that conduct, and the chances of success and the economic reality of pursuing the claim. The highly lethal nature of an acute aortic dissection makes it essential for the physician to recognize patients who are more likely to present atypically, and to aggressively pursue the diagnosis of acute aortic dissection. Whether the physician is ultimately liable for the poor outcome will depend not just on the breach of the standard of care, but whether it was a legal cause of the poor outcome. A poor outcome in and of itself does not create legal liability.



Expect new diagnostic method

- A rapid 30-minute immunoassay for the serum concentration of **smooth muscle myosin heavy chain** has been evaluated in patients suspected of having an aortic dissection
- The sensitivity and specificity of this assay in the first three hours were similar and possibly superior to those of TTE, conventional CT, and aortography, but were lower than those of TEE, helical CT, or MRI. The utility of this test needs further evaluation.

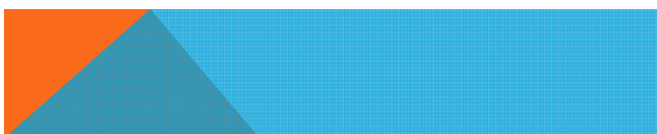


TREATMENT

- antihypertensive treatment → **B-BLOCK**: IV metoprolol or esmolol is commonly used. **(120 to 130 mm Hg is a reasonable starting point.)**
 - Esmolol → initial bolus of 0.1 to 0.5 milligram/kg IV over 1 minute followed by an infusion of 0.025 to 0.2 milligram/kg/min.
 - Metoprolol → 5-milligram doses up to a 15-milligram initial bolus, followed by IV infusion at 2 to 5 milligrams per hour.
 - Labetalol (a-blocker with limited-blocking characteristics in a 7:1 ratio) also may be used at an initial dose of 10 to 20 milligrams IV with repeat doses of 20 to 40 milligrams every 10 minutes to desired effect or a maximum dose of 300 milligrams.
- antihypertensive treatment → Nitroprusside
 - Nitroprusside → initially infused at a dose of 0.3 microgram/kg/min IV.

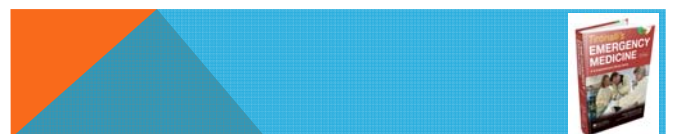


- Aortic dissections may cause hypotension that requires fluid or blood product resuscitation.
- Rapid referral to a surgeon is mandatory. Dissection with involvement of the ascending aorta requires prompt surgical repair.



Endovascular repair has rapidly been accepted as an appropriate method of treating some aortic type A and type B dissections, penetrating ulcers, and intramural hematomas. Endovascular therapy has uncertain long-term effects but has shown short-term benefit.

Endovascular treatment is minimally invasive and avoids sternotomy and circulatory arrest. In treating dissection, goals of therapy include expansion and stabilization of the true lumen and passive resorption of thrombosis of the false lumen. In addition, visceral artery blood flow can be restored passively or by fenestration of the initial flap. In general, endovascular stent grafts should not be used in the setting of connective tissue disease.



Take home message

- AAD may demonstrate diverse symptoms of various types of severity, which lead physicians to its misdiagnosis.
- Hx taking and PE are most important and instant
- CXR f/u by Contast CT for relative stable, TEE for vital signs unstable
- Predictors for AAD: 有任意兩個，預測率>83% ,若三個都無，則機率很低
 - immediate onset,a tearing/ripping character
 - mediastinal widening/aortic widening on chest radiography
 - pulse differentials,blood pressure differentials.
- In the misdiagnosed patients, **walk-in mode** of admission and **anterior chest pain**較常見較少有**widened mediastinum**.
- **There are no blood tests that diagnose dissections, smooth muscle myosin heavy chain may be a new diagnostic test.**

REFERENCE

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Thank you!