New murmur: acute valvular regurgitations.

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Acute valvular regurgitation

Clinical case

- Mr. "Dupont", a 53 y old men, without any particular medical history
- On Thursday octobre 14th, he was working at the airport as usual

When....

- Suddenly, he complains of chest pain and collapse....
- Emergency team called, diagnoses a heart attack and prepare patient for transfer to hospital emergency department (opioids, were given)
- Patient arrives shocked in the ER

ECHOCARDIOGRAPHY....
Acute valvular regurgitation
Clinical case
Acute valvular regurgitation
Clinical case
Acute valvular regurgitation
Clinical case
From a new murmur to cardiovascular collapse depending how acute is the regurgitation...

Examination findings suggesting acute regurgitation may be subtle, and the clinical presentation may be nonspecific.

The presentation of acute valvular regurgitation may be mistaken for other acute conditions, such as sepsis, pneumonia, or nonvalvular heart failure.....
Acute valvular regurgitation

**Causes**

**Aortic**
- Endocarditis
- Aortic dissection (A)
- Ruptured fenestration
- Blunt chest trauma
- Prosthetic dysfunction
- Complic percutaneous tech

**Mitral**
- Endocarditis
- Chordal rupture
- Papillary muscle rupture
- Prosthetic dysfunction

**Organic**
- Papillary muscle dysfunction due to ischémia

**Functionnal**
- Cardiomyopathy (acute)
Acute valvular regurgitation
Physiopathology of aortic regurgitation

<table>
<thead>
<tr>
<th></th>
<th>Acute</th>
<th>Chronic</th>
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<tbody>
<tr>
<td>Cardiac output</td>
<td>↓</td>
<td>N</td>
</tr>
<tr>
<td>Pulse pressure</td>
<td>N ↓</td>
<td>↓</td>
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<tr>
<td>Syst pressure</td>
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<td>↑</td>
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<tr>
<td>LV ED pressure</td>
<td>↑↑</td>
<td>N</td>
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<td>LV size</td>
<td>N</td>
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![Graph showing changes in pressure and velocity in acute and chronic aortic regurgitation](image)

- **Aortic outflow**
- **Acute AR**

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**Notes:**
- Acute valvular regurgitation involves sudden and significant blood flow back from the aorta to the left ventricle.
- Chronic valvular regurgitation develops over time and usually results in a gradual increase in left ventricular compliance.
- Key parameters include cardiac output, pulse pressure, systolic pressure, left ventricular end-diastolic pressure, and left ventricular size.
- The graph illustrates changes in pressure and velocity over time, highlighting the differences between acute and chronic regurgitation.

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**References:**
- [Valvular Heart Disease: Pathophysiology, Diagnosis, and Treatment](https://www.ncbi.nlm.nih.gov/pubmed/29233338)
- [Aortic Valve Disease: Diagnosis and Management](https://www.ncbi.nlm.nih.gov/pubmed/28894432)
### Acute valvular regurgitation

**Physiopathology of mitral regurgitation**

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**Graphical Representation**

- **Pressure (mmHg)**
  - LA: Lower Atrial Pressure
  - LV: Left Ventricular Pressure
  - V-wave

- **Velocity (m/s)**

**Legend**

- **V-wave**
- **Acute MR**
Acute valvular regurgitation

Clinical presentation

- Dyspnea, hemodynamic instability, shock
- Symptoms related to underlying cause: fever...
- Worsening of a previous regurgitation
- Clinical sign: murmur
  but: not always easy to diagnose
  cfr: rapid equilibration of pressure.....
Acute valvular regurgitation

Diagnosis

- EKG: tachycardia, non-specific ST changes or ischemic ST changes.
- Chest Xray: pulmonary oedema, normal sized heart, enlarged aortic root.

Echocardiography

The cornerstone of diagnosis!
Acute valvular regurgitation
Echocardiography

- Confirm the diagnosis
- Demonstrate the mechanism
- Quantify the severity of regurgitation
Acute valvular regurgitation
Aortic regurgitation: endocarditis

56 yo man with fever for 5 day and alteration of general condition

No cardiac condition known
Acute valvular regurgitation
Aortic regurgitation: endocarditis
Acute valvular regurgitation
Aortic regurgitation: endocarditis
Acute valvular regurgitation
Aortic regurgitation: aortic dissection
Acute valvular regurgitation
Valve dysfunction

40 yo woman with history of aortic stenosis treated with aortic homograft 5 y ago, fever, new aortic murmur and rapid worsening to cardiogenic shock
91 yo woman admitted for pulmonary edema, diagnosed with critical aortic stenosis
Acute valvular regurgitation
Aortic valvuloplasty
Acute valvular regurgitation
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Acute valvular regurgitation
Aortic valvuloplasty
Acute valvular regurgitation
Mitral regurgitation: organic or functional

Mitral

Organic
Endocarditis
Chordal rupture
Papillary muscle rupture
Prosthetic dysfunction

Functionnal
Papillary muscle dysfunction due to ischemia
Cardiomyopathy (acute)

Surgery
or
R/ heart failure
Acute valvular regurgitation
Mitral regurgitation: rupture papillary muscle rupture

60 yo man with history of chest pain a few day ago, progressive dyspnea and hypotension
Acute valvular regurgitation
Mitral regurgitation: rupture papillary muscle rupture
Acute valvular regurgitation
Mitral regurgitation: rupture papillary muscle rupture
50 yo man with fever and progression alteration of general status, fever, cough, dyspnea
Acute valvular regurgitation
Mitral Valve dysfunction

65 yo man with previous mitral valve replacement by mechanical prosthesis, dyspnea
Acute valvular regurgitation
Mitral Valve dysfunction
Acute valvular regurgitation
Mitral regurgitation: worsening of ischemic MR

72 yo woman with previous history of MI, 3 vessels disease, and MR, new onset of chest pain, dyspnea
Acute valvular regurgitation
Mitral regurgitation: worsening of ischemic MR
Acute valvular regurgitation
Quantification of severity

Color doppler, regurgitant jet area

Difficult, hemodynamic reasons (unstable patient), excentric jet

PISA, ERO, VR

Less reliable: tachycardia, low blood pressure

So in contrast to chronic regurgitation, quantitative measurement will not contribute to management decision
Acute valvular regurgitation
Echo findings in acute aortic regurgitation

- Vena contracta > 6mm
- PHT < 200 msec
- Holodiastolic flow reversal in abdominal aorta
- Premature mitral valve closure
- Normal LV size and fonction
Acute valvular regurgitation
Echo finding in acute mitral regurgitation

Vena contracta >7 mm
Reversed pulmonary V flow
Decreased aortic valve opening
Disrupted MV apparatus
Normal LV function?
Acute valvular regurgitation
In clinical practice.

- Severity of valvular regurgitation will be assessed....
Acute valvular regurgitation

**Conclusion**

- The first step in diagnosis is to suspect valvular regurgitation.

- The second step is to perform echo, to confirm diagnosis, assess mechanism and “severity” to assure a prompt surgical treatment.

- Never forget that a moderate acute regurgitation is poorly tolerated by a “untrained” left ventricle who is not able to compensate abruptly to a volume overload or change