AORTIC REGURGITATION

Aortic regurgitation is one of the aortic valve diseases, the aorta being the artery that brings oxygenated blood to the systemic circulation. The other one is the aortic valve stenosis. Other valvular heart diseases are these two valvular diseases of

1. the pulmonary artery, the artery that brings non oxygenated blood to the lungs, coming from the right ventricle through the pulmonic valve; both the pulmonary and the aortic valves are tricuspid.
2. the right atrium, this atrium that brings systemic venous blood to the right ventricle, through the tricuspid valve (a valve with three cups)
3. the left atrium that brings oxygenated blood coming from the pulmonary veins to the left ventricle, through the mitral valve (a bicuspid valve)

Ethiology of the disease - What may cause it?:

One of the following numerous causes can cause aortic regurgitation:

1. Common causes:
   a. In adults, the commonest cause of severe aortic regurgitation are
      i) rheumatic heart disease
      ii) and endocarditis
   b. the commonest causes orf adult mild aortic regurgitation are:
      i) the bicuspis aortic valve, a malformation
      ii) and severe sytemic hypertension with diastolic pressure ≥ 110 mm Hg (both causes may coexist, the first one at the basis of the second one); [the Merck’s Maual is not even sure and is advancing things that it is not sure of it]
   c. In children it is the ventricular septal defect with aortic valve prolapse

2. Rare causes:
   b. In association with arthritis:
      i. Ankylosing spondylitis
      ii. Reiter’s syndrome
      iii. Rhumatoid arthritis
      iv. Psoriatic arthritis
      v. Systemic lupus erythematos
      vi. Ulcerative colitis
   b. Without arthritis:
      i. Leutic (syphilis) aortitis
      ii. Osteogenesis imperfecta
      iii. Dissecting aortic aneurysm
      iv. Supravalvular aortic stenosis
      v. Aortic arch syndrome (Takayasus’s disease)
      vi. Rupture of a sinus of Valsava *
      vii. Giant cell arteritis
      viii. Marfan’s syndrome with myxomatous transformation
The classification of *emedicine, Medscape* (http://www.emedicine.com/med/topic156.htm) is different ans is

1. **Acute aortic regurgitation** due to
   a) **Infective endocarditis** with destruction or perforation of the aortic valve leaflet; the vegetation can also interfere with proper coaptation of the valve leaflets and can sometimes lead to frank prolapse or flail of a leaflet
   b) **Acute ascending aortic dissection** (type A), the retrograde proximal dissection flap undermines the commissural suspensions of the aortic valve leaflets. Varying levels of aortic malcoaptation and prolapse occur.
   c) **A Prosthetic valve** (artificial device [valve] used to replace a missing body part [valve]) malfunction
   d) **Chest trauma** may lead to a tear in the ascending aorta and disruption of the aortic valve support apparatus
   e) **Sport injury** that may accompany improper nutrition which may lead also to tear or other kinds of damage, like acute ascending aortic dissection, rupture of the Valsalva sinus or rupture of the chordae tendineae, the later being represented in the picture of the inside of the heart, below
2. **Chronic aortic regurgitation**
   
a) **Congenital bicuspid aortic valve:** While a congenital bicuspid aortic valve often leads to progressive aortic stenosis, incomplete closure or prolapse can also lead to significant regurgitant flow across the valve.

b) **Some Connective tissue disorders** including:
   - Marfan syndrome,
   - Ehlers-Danlos syndrome,
   - floppy aortic valve, aortic valve prolapse,
   - Sinus of Valsalva aneurysm,
   - and aortic annular fistula can all lead to significant chronic AR.
• The use of diet drugs such as fenfluramine and dexfenfluramine (commonly referred to as Phen-Fen) may lead to chronic AR, although these data remain controversial at this time.
• Syphilitic aortitis
• Takayasu arteritis
• Ankylosing spondylitis
• Reiter syndrome
• Rheumatoid arthritis
• Systemic lupus erythematosus (SLE)
• Behçet disease is a diffuse aortitis

Symptoms and signs:

History
1. Effort tolerance remains remarkably good for many years even with severe regurgitation.
2. Finally, dyspnea develops
   ◊ on exertion,
   ◊ orthopnea (difficulty of breathing in the supine position)
   ◊ and paroxysmal nocturnal dyspnea develop. The patient may experience palpitations because of the awareness due to LV (left ventricular).
3. Angina pectoris occurs in only about 5% of patients and with gross aortic regurgitation

Inspection
1. The large carotid pulsation seen in the neck is called Corrigan’s pulse
2. The head nodding that occurs due to the ballistic force of the large stroke volume is called De Musset’s sign
3. The pulsatile blanching and reddening of the fingernails is called capillary pulsation or Quincke’s sign

Palpation
1. The large pulse pressure with its brisk rise, the tendency for the arterial pulse to be slapping and fall away rapidly is called a water hammer pulse

Auscultation
1. Arterial pressures:
   a. The systolic pressure is higher than normal
   b. A positive Hill’s sign is present when the systolic BP is 20 mm Hg higher in the leg than in the arm
2. Heart sounds
   b. The sharp sound heard over the femoral artery is called the pistol shot sound or Traube’s sign
c. The $S_2$ (the second heart sound that accompanies the closure of the aortic and pulmonary valves and is best heard with the diaphragm of the stethoscope in the 2$^{nd}$ and 3$^{rd}$ right (for the aorta) and left (for the pulmonary) intercostal space may disappear if the AR is gross

3. Heart Murmurs
   a. Diastolic murmurs:
      i. There is a pandiastolic decrescendo murmur best heard or loudest over the sternum and left sternal border; if the aortic insufficiency is trivial it will be blowing with high frequencies
         - If the AR is not rheumatic this murmur but due to ruptured cups or to an ascending aortic aneurysm this murmur may be loudest along the right sternal border
         - Often the murmur is heard is heard best over the axilla or the mid-left thorax and is called Cole-Cecil murmur
      ii. An Austin Flint murmur - an apical, rumbling, mid- to late-diastolic murmur - may also occur due to the prevention of full opening of the anterior mitral leaflet by the descending aortic regurgitant stream. Lowering aortic pressure and decreasing AR with amyl-nitrite will attenuate the Austin Flint murmur
   b. Systolic murmurs: an aortic ejection flow murmur due to excessive forward flow, which may imitate aortic stenosis may be present; an aortic ejection sound is especially common if there is a bicupsid aortic valve
   c. The combination of forward ejection and backward regurgitant flow murmur is called to-and-fro murmur

* Between the semilunar valves and the wall of the pulmonary artery are three pouches or sinuses (sinuses of Valsalva) - Opposite the valves the aorta presents slight dilatations, the aortic sinuses (sinuses of Valsalva), which are larger than those at the origin of the pulmonary artery