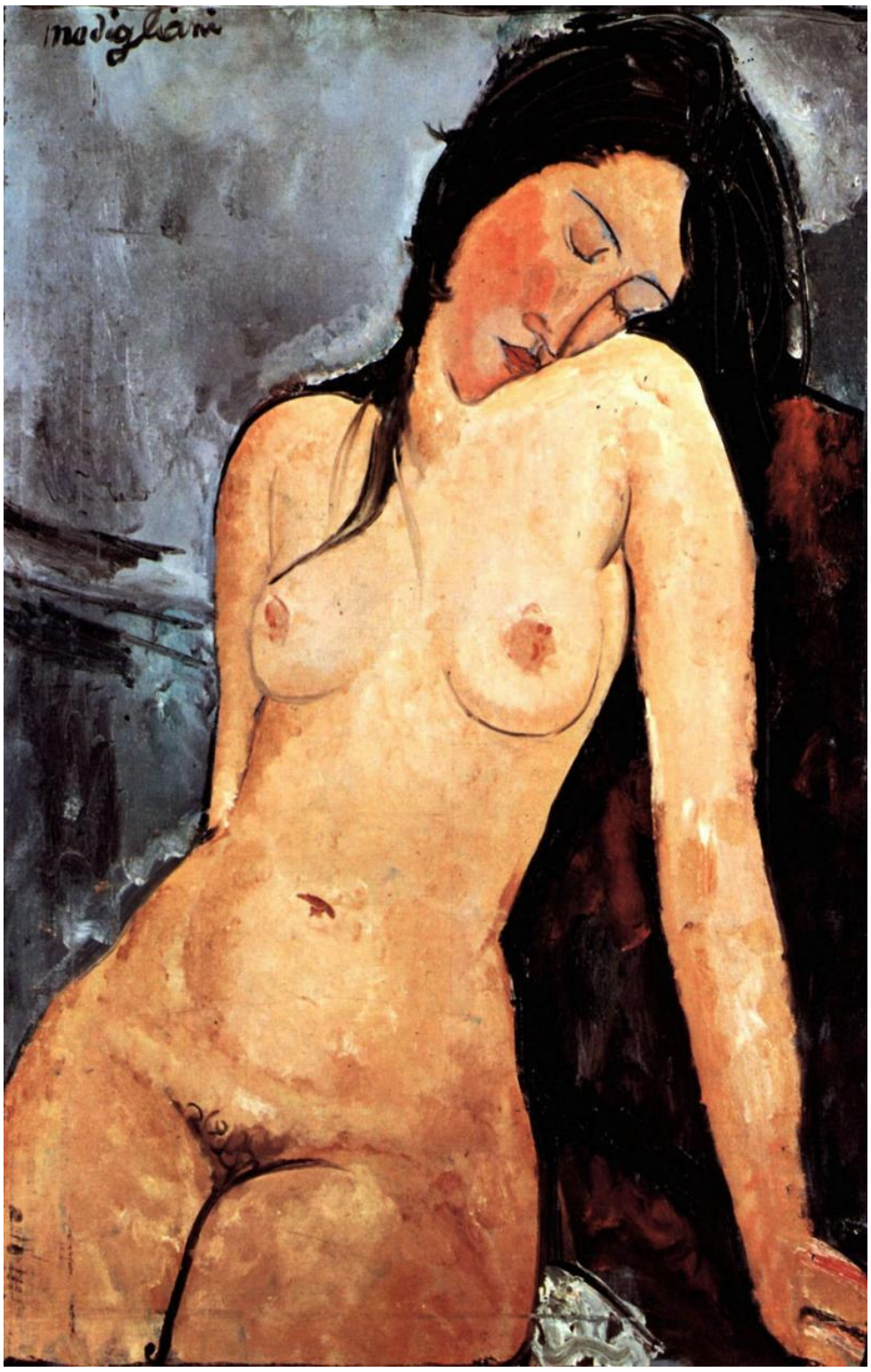
THE NORTHERN HOSPITAL

MYOCARDIAL CONTUSION



"Female Nude", oil on canvas, Amedeo Modigliani 1916

"Happiness is an angel with a grave face", Amedeo Modigliani.

By 1916 Amedeo Modigliani, bohemian painter of Montparnasse, was in dire straits. His paintings were not selling, he was starving, he needed a new agent. Then he got one. A Polish immigrant by the name of Leopold Zborowski, who would become wealthy in his later years as a premier Parisian art dealer. Leopold immediately recognized great talent in the young impoverished artist, and he agreed to take him on - but there were some conditions, amoung them Amedeo would have to start painting nudes. He had done plenty of nude drawings in the past, but till then no oils. He agreed and his first public one-man exhibition was held on Monday December 3rd 1917 at the gallery of Berthe Weill, a rather "prickly, peppery, schoolmarm of a woman". Berthe displayed Amedeo's startling nudes in the very front window of her gallery in the Ninth Arrondissement. They created an instant sensation with great gawking crowds gathering at her gallery - which happened to be directly across the road from the Ninth Arrondissement police department. Soon enough a plain clothes policeman arrived on the scene to see what all the fuss was about - and was shocked by what he saw. He asked Weill to remove the offending paintings from the gallery windows, but Berthe refused, whereupon the policeman promptly escorted her to the police station across the road. The chief constable again asked Berthe to remove the works from the street windows, as they were an "offense against public morals". Berthe said there were plenty more inside - why couldn't she show some in the window. "What is problem", she "innocently" asked. The by now visibly alarmed chief constable flushed a furious crimson and stammered out, "They've got pppubic hairs!".

Merle Secrest, Amedeo's recent biographer, explained his response to the delicate situation:

"Modigliani returned temporarily to portraits and when he tackled other nudes the offending areas were covered, as they had been since time immemorial, by lingerie, draperies, or a hand in the right place. His was the dilemma common to every Artist, i.e. how to be true to his inner vision and at the same time reconcile himself with what the market wanted to buy, or was ready for at that moment. Walking such a tightrope was something he never mastered, even though he was aware that others were making a success of it. He was poised somewhere in the background, too much of an innovator to capitulate, too short of money not to hope that small concessions would induce someone to buy something. As it happened, public morals capitulated first, and sooner than he could have imagined. Five years later one of his forbidden nudes was sold at the Salle Drouot in Paris for 22,000 francs".

But by then Amedeo would be dead. Today his nudes are his most sought after works. In 2004, his "Reclining Nude" of 1917 sold at Christie's in New York, for 26.9 million USD.

Modigliani's nudes were a departure from his usual work, and yet many of the essential features of his unique style remained in them. In particular the enigmatic mask-like face. Amedeo in his early years was profoundly influenced by the mysterious mask-like faces of the Baule sculptures of the Ivory Coast of the late Nineteenth century, with their slender inverted triangular silhouettes, long elongated necks and long elongated triangular noses, small mouths and closed or blank unseeing eyes. Meryle Secrest, explains these works as being endowed with stonelike unreadable stares that African worship and sacrifice had imparted an uncanny potency to - "reminiscent of ancient Egyptian or Archaic period Greek sculptures". And this is the effect that many of Modigliani's works do have. Secrest makes a convincing argument that Modigliani himself presented a mask to the outside

world. Devastated by his family's financial demise and his own subsequent poverty, his secret disease - tuberculosis, a condition that was highly stigmatized in his day, and his addiction to alcohol and opiates, the only antidotes to his tell tale symptoms as well as his inner distress, he wore his own emotional mask. He could not get close to people and he would not let them get close to him. Secrest paints a compelling picture, quoting Werner Schmalenbach, an expert on Modigliani's works; "It is possible…to ask whether Modigliani was deeply interested in his sitters at all. His commentators answer the question in the affirmative, but this is probably the result of conventional expectations, because the paintings themselves do very little to confirm it. How little he says about, say, his friend Max Jacob. How little about the essence of his mistress Beatrice Hastings. However skillfully he characterizes those whom he paints, how little he penetrates into them. The depiction always remains very much distanced" - as if they were wearing masks, adds Secrest! To add to the effect of mystery many of Amedeo's portraits, have blank eyes, if not both, then at least one of them is blanked out- just blotches without the detail of pupil - of expression - unreadable blank stares.

Amedeo's "Female Nude" of 1916, that caused such a scandal, has the typical African sculpture mask like face that would come to dominate his later works. We cannot read her eyes, not in this instance because of his motif of blank sockets - but because the model has her eyes firmly closed. And yet, like his masterpiece "The Cellist", despite the masklike face and unreadable eyes that form barriers to outside interpersonal communication - there is a genius in the way in which Modigliani conveys an inner hidden spiritual emotion. The sitter is lost in their own world and thoughts - the Cellist in his Art, the woman of 1916, in her own inner serenity. If she suffers, and hides from the world, as does Amedeo himself, then at least she appears at peace with herself - at peace in her own thoughts - not the least self-conscious of her physical body which she readily shows to the painter - and indeed to the world. Even the times Amedeo could attain inner peace he had been scarred to such a degree that he had become incapable of the outward expression of it. He once wrote, "Happiness is an angel - with a grave face".

Our patients who present with myocardial contusion, unfortunately do so with a Modigliani like masked face. Though the diagnosis is not outwardly easy to see, we can glean some indirect evidence to the hidden turmoil that exists within. We do this by means of the echocardiogram, the ECG and cardiac troponins.

MYOCARDIAL CONTUSION

Introduction

Myocardial contusion occurs as a result of blunt injury to the heart.

There may be significant associated injuries to the heart itself, but also to other structures of the thoracic or abdominal cavities, for which there must always remain a high index of suspicion.

The absence of a clear definition or of an accepted gold standard for testing makes the diagnosis of cardiac contusion difficult.

Precise diagnosis is therefore problematic and will usually be made on the basis of the clinical setting of blunt chest trauma together with either or any combination of:

- ECG abnormalities - in particular arrhythmias.
- Elevated cardiac troponin levels
- Echocardiographic abnormalities - possibly progressing to hypotension and cardiogenic shock

Lesser degrees of myocardial contusion are common, but do not usually result in serious problems.

More major injuries may result in life-threatening complications but overall these are uncommon.

This document refers primarily to isolated myocardial contusion without secondary structural complications of blunt cardiac injury, although an index of suspicion must always be maintained for these.

For penetrating cardiac injury, see separate document, "Traumatic Cardiac Tamponade".

Pathology

Associated injuries:

It is important to appreciate that myocardial contusion may occasionally be associated with significant secondary structural complications, including:

1. Rupture of the atrial or ventricular wall with the development of subsequent cardiac tamponade.

   Cardiac tamponade however is *rare* in the setting of blunt trauma; this is primarily a problem of penetrating cardiac injury.

2. Rupture of a cardiac valve or papillary muscle with subsequent acute valvular incompetence. This is also rare

Myocardial contusion will not often present as a problem in isolation.

As myocardial contusion is the result of significant blunt trauma, other associated injuries the thorax and chest are possible and should be actively considered and ruled out according to index of suspicion.

Other less apparent associated injuries may include **traumatic injury to the aorta**, **esophageal** and **diaphragmatic rupture.**

Complications of myocardial contusion:

These include:

1. Arrhythmias, including conduction abnormalities.

2. Acute heart failure with hypotension.

Right and left heart contusion:

Right sided contusions tend to be more common than left sided ones, as the right ventricle lies closer the anterior chest wall.

Clinical Features

Symptoms and signs directly related to myocardial contusion will simply reflect the secondary complications of the injuries listed above and so will primarily relate to:

1. Tachycardia with hypotension/ cardiogenic shock:

    - It should be assumed in the first instance however that tachycardia or hypotension in a trauma patient stems from **hemorrhage** (rather than cardiac dysfunction), until proven otherwise

    - Patients with unexplained sinus tachycardia that persists over several hours despite adequate fluid resuscitation and pain control raises suspicion of myocardial contusion.

2. Arrhythmias

Any symptoms of pain suffered by patients with myocardial contusion will usually be as a result of associated injuries, such as **sternal** or **rib fractures** rather than from the cardiac contusion itself.

Investigations

The diagnosis of myocardial contusion is usually inferred from its secondary complications, there currently being no truly specific or sensitive test that confirms it.

The only "gold standard" investigation is surgical exploration and direct inspection, (or ultimately, of course, autopsy).

The following investigations may be done in suspected myocardial contusion:

Blood tests:

1. FBE

2. U&Es/ glucose

3. Blood group and cross-match as clinically indicated.

4 **Troponin levels:**

- Cardiac enzymes do elevate in myocardial contusion and so assist in making the diagnosis of the injury.

ECG:

A 12 lead ECG should be performed in all cases of possible or suspected myocardial contusion.

Although the ECG is commonly relied on to diagnose the presence of myocardial contusion, it is non-specific and only moderately sensitive.

The ECG poorly portrays the right ventricle where the majority of contusions occur.

Virtually any abnormality may be seen on ECG recording, including:

1. Persistent sinus tachycardia:

   - Although it should always be assumed in the first instance that hemorrhage is the cause of tachycardia in a trauma patient until proven otherwise.

2. Premature atrial and ventricular contractions.

3. Arrhythmias:

   - In particular AF, VT

   - Cardiac arrest, VF/ asystole

- Arrhythmia is the commonest severe complication of contusion and so the ECG is an essential part of the assessment and ongoing monitoring of a patient with a suspected myocardial contusion.

4. Conduction abnormalities/ new bundle branch blocks.

5. Non-specific ST segment changes.

6. Frank ST segment elevation indicating myocardial infarction:

    - Which may in fact represent a STEMI that initiated the injury event itself.

    Or

    - May be as a result of catecholamine induced stress, secondary to trauma in general, (including Stress induced (or Takotsubo) cardiomyopathy

    Or

    - Rarely direct damage to the LAD, with thrombosis/ dissection of the vessel.

CXR:

A chest x-ray is done in the context of any traumatic injury to the chest, however it will not assist in a specific diagnosis of myocardial contusion.

It main use is in helping to rule out associated injuries.

Ultrasound - FAST Scan

To help rule out obvious blood in the pericardial space, that may suggest cardiac tamponade.

The FAST is an good screening test for clinically significant hemopericardium.

A positive result should mandate **echocardiography.**

Echocardiography:

Echocardiography is a very useful test for the patient with suspected myocardial injury.

Contusion is indicated by **cardiac wall motion abnormalities.**

It will also be able to assess for any **serious structural damage** to the myocardium, such as **valvular injuries** or **cardiac tamponade** from **myocardial wall rupture.**

A transesophageal echocardiogram will give better information than TTE, but is invasive and requires anesthesia.

Management

1. ABC:

    - As for any multitrauma, attention should be paid to any immediate life-threatening ABC issues.

2. Treatment of any other associated life-threatening injuries.

3. Analgesia:

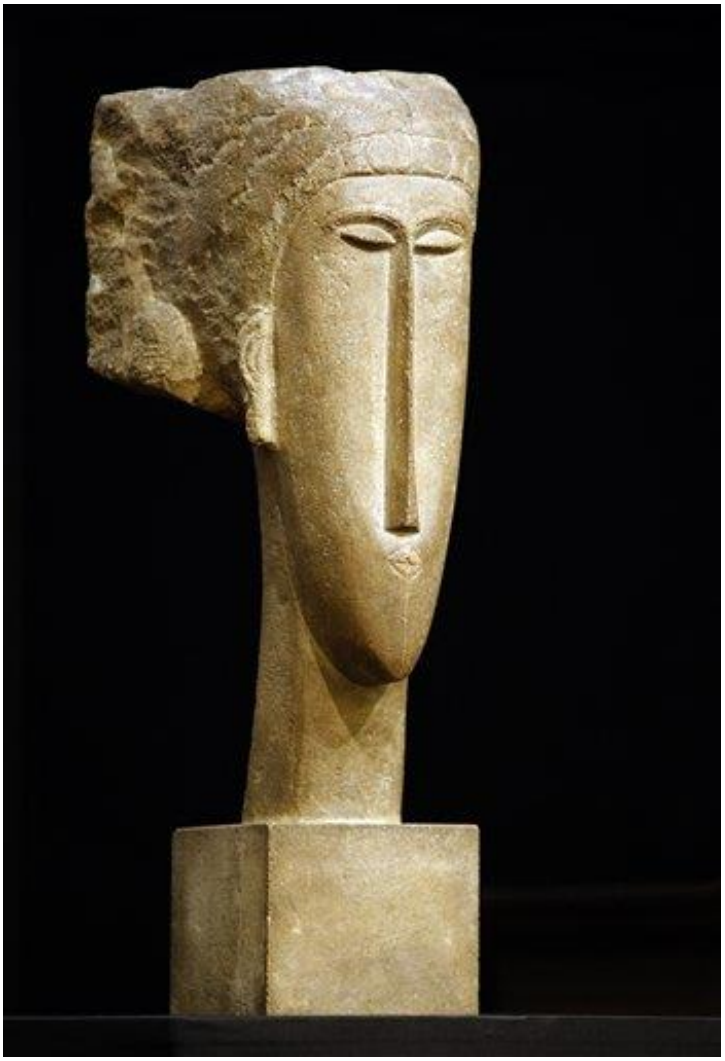
    - Give analgesia, as clinically indicated.

4. ECG monitoring: [2]

    - Patients with abnormal ECGs, troponins or unexplained hypotension should be monitored for at least **24 hours** after significant blunt chest trauma. [1]

    - Patients with normal ECGs and troponin measurements repeated at 8 hours appear to be at low risk of complications and may be treated based on the needs of their other injuries. [2]

5. Treatment of any complications will be according to conventional protocols.



Left: Head, carved stone, Amedeo Modigliani c. 1913. Right: African Mask, carved wood, Late Nineteenth century.

The strong influence these African masks had on Modigliani's works can be seen in the elongated inverted triangular faces with long upright triangular noses and small mouths.

References

1. 10th ATLS 2017.

2. C.L Foot. Myocardial Contusion. Critical Care and Resuscitation 2005; 7: 29-31.

3. Eric Legome et al. Cardiac injury from blunt trauma in Up to Date Website, June 2018.

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