Sheer Heart Attack:

Why the Myocardial Infarction definition is Critically flawed

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Current Heart Attack definition

ABI – Model Wording 2006 to date

Heart attack – *of specified severity*

Death of heart muscle, due to inadequate blood supply, that has resulted in all of the following evidence of acute myocardial infarction:

- Typical clinical symptoms (for example, characteristic chest pain).
- New characteristic electrocardiographic changes.
- The characteristic rise of cardiac enzymes or Troponins recorded at the following levels or higher;

- Troponin T > 1.0 ng/ml
- AccuTnI > 0.5 ng/ml or equivalent threshold with other Troponin I methods.

The evidence must show a definite acute myocardial infarction.

For the above definition, the following are not covered:

- Other acute coronary syndromes including but not limited to angina.

How effective is Troponin as a measurement of 'severity' in the context of the Myocardial Infarction definition?

- Emerging data clearly shows a definite correlation between the Troponin level and medical prognosis, even at very low levels....
- In a ‘medical context’, Troponin is of significant value for diagnosis differentiation and patient risk assessment....

4

BUT, in an ‘Insurance context’.....

5

Troponin levels do not provide an effective measurement of “severity” for assessing MI critical illness claims because.....

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8

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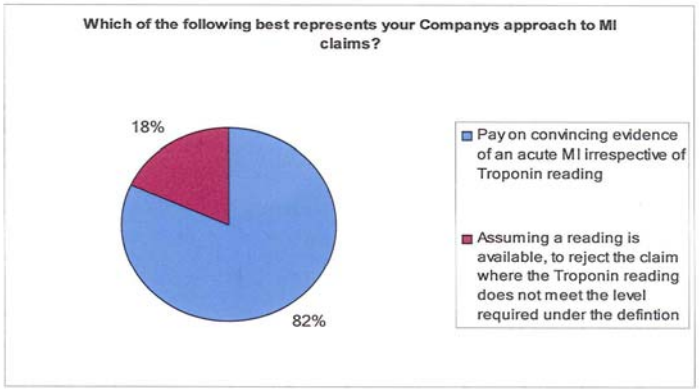
- This inconsistency places pressure on insurers to pay claims that fail the contractual definition

9

Myocardial Infarction - Insurer's attitude to a "severity test"?



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- This inconsistency places pressure on insurers to pay claims that fail the contractual definition
- There is clear inconsistency with the Cardiomyopathy definition – Troponin is often elevated in cardiomyopathy but we don't use it for severity

Troponin does not provide a very effective measurement of "severity" for MI claims because.....

- Troponin is more of a 'diagnostic' and 'risk assessment' tool rather than a severity indicator
- We don't always receive the Troponin levels or know if they are 'peak' readings
- Relative to the insured's overall situation, high value MI claims appear to generate 'windfall' payments
- As far as the claimant is concerned, they have had a heart attack

12

More problems in the future?

13

Future problems?

- Will a Troponin test always be performed - Changes to the clinical pathway
- Clinical STEMI presentation based on ECG = urgent surgical revascularisation or thrombolysis?
- Impact on Troponin level of thrombolysis or immediate surgical revascularisation? What level would it have reached without intervention?

Future problems?

- Increasing development of hypersensitive assays will lead to increasing incidence of MI diagnosis – i.e. conversion of ACS (non-MI) to NSTEMI
- Results of March 2012 study – N L Mills. BHF/University Centre for Cardiovascular Science, University of Edinburgh

http://www.bmj.com/content/344/bmj.e1533

Study findings

- 2092 suspected ACS patients
- Split into 3 groups based on Troponin I level of:
- GROUP A GROUP B GROUP C

  <0.012 ug/L (47%) 0.012ug/L – 0.049ugl (17%) >0.050ug/L (36%)

- Against diagnostic threshold for this assay* of 0.050ug/L
- Lowering the diagnostic threshold = Increased diagnosis of MI from 752 to 1104 – a relative increase of 47% (42,000 patients per annum in the UK)
- Follow-up average 446 days – patients in GROUP B had a death or re-infarction rate 4 x higher than GROUP A patients

*Abbott ARCHITECT Troponin I assay

16

Future problems?

- Rapid development of biochemical markers for diagnosing MI with a lack of standardisation – hard/impossible to create a sustainable fixed definition using Troponin values?

- Currently there are 24 commercially available Troponin assays (International Federation of Clinical Chemistry)
- Heart Fatty Acid binding Protein (H-FABP) – (in conjunction with Troponin)
- Myoglobin - (Rapid – but less cardiospecific)
- B-type natriuretic peptide (BNP) – (High value prognostic indicator)

17

Future problems?

If the diagnosis incidence of MI increases, depending on the Troponin level and type of severity test used in the definition we will;

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18

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19

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- Have to significantly increase product cost to pay additional claims
- Potentially expose any 'back book' of business written on the definition to significant risk of claims that were not priced for
- Risk increasing the proportion of declined claims for definition failure
- Risk an increase in commercial payments for definition failure that are not priced for

Myocardial Infarction (CI) definitions around the world

Myocardial Infarction definitions around the world

- South Africa – Standardised wording / Tiered approach (25% -100%) / Severity based around EF / LVEDD / NYHA

  Troponin to confirm diagnosis

- Canada – Definite diagnosis only / No tiering / No standard wording.

  Troponin to confirm diagnosis (no levels included in wording)

- Australia – Definite diagnosis only / No standard wording / No tiering / EF used as qualifier if other criteria not met

  Troponin to confirm diagnosis (Trop I >2.0ug/L or Trop T > 0.60ug/L)

- Asia – Mostly standardised wording / No tiering (in development) / Mostly severity based around EF

  Troponin to confirm diagnosis

Global differences

- South Africa, Asia, UK severity test – rest, definite diagnosis only
- Where severity test applied; based on reduced ejection fraction or other indicator of significant myocardial damage or impaired function (chamber size) or physical symptoms (NYHA)
- Use of Troponin in the definition is widespread – BUT mostly to confirm diagnosis and levels can differ from UK
- For tiered cover (South Africa) Troponins are a factor in determining severity (lower = less) at 25% / 50% payment level
- In Australia the thresholds vary from the UK ranges;

  UK = Troponin T >1.00 ng/ml / Troponin I >0.50 ng/ml

  Aus = Troponin T >0.60 ng/ml / Troponin I >2.00 ng/ml

24

Time for a new approach?

25

New approach?

- ABI workgroup creating a new definition
- Retain a severity approach? – but in a different form?
- Further details due soon.....

26

New approach?

100% Payment

Heart attack – *of specified severity*

A definite diagnosis of acute myocardial infarction resulting in death of heart muscle due to inadequate blood supply which is evidenced by all of the following:

- Typical clinical symptoms (for example chest pain)
- The characteristic evolution of new ECG changes
- **Elevation above the diagnostic threshold (for MI) of an appropriately validated cardiac biomarker**

where all of the above are consistent with a definite diagnosis of acute myocardial infarction, **and result in one or more of the following criteria being permanently present despite optimal therapy;**

- **Ejection Fraction of 40% or less**
- **Left Ventricular End diastolic Diameter (LVEDD) of 65mm or more**
- **Symptoms and limitation of physical activity that are consistent with and classified as stage III under the New York Health Association (NYHA) criteria**

Payment will not be made for:

- *Other inflammatory heart conditions and acute coronary syndromes, including but not limited to unstable angina*
- ***Elevation of any cardiac biomarker in the absence of a definite diagnosis of acute myocardial infarction***

50% or 25% Payment

Heart attack

•A definite diagnosis of acute myocardial infarction resulting in death of heart muscle due to inadequate blood supply which is evidenced by all of the following:

- Typical clinical symptoms (for example chest pain)
- The characteristic evolution of new ECG changes
- **Elevation above the diagnostic threshold of an appropriately validated cardiac biomarker**

where all of the above are consistent with a definite diagnosis of acute myocardial infarction.

Payment will not be made for:

Other inflammatory heart conditions and acute coronary syndromes, including but not limited to unstable angina

Elevation of any cardiac biomarker:

- ***in the absence of a definite diagnosis of acute myocardial infarction, or***
- ***resulting from the undergoing of a surgical procedure***

27

Benefits of this new approach?

- Severity test – BUT, based around evidence of impaired cardiac performance post event (aligned with Cardiomyopathy)
- Ejection Fraction set quite low at 40%
  - Allow for possible improvement after optimal therapy
  - Avoid (90 days+) delay in assessing/paying claim
- Pay ALL claims for a definite diagnosis of MI
- Pay reduced benefit as 'accelerated' – remaining 50% or 75% paid on re-infarction or other covered CI condition
- Likely reduction in overall claims cost for MI – fewer claims paid at 100% value
- Re-introduce a more appropriate 'criticality' element

28

Introducing a two tier criteria could...

- Mean that in future, ALL definite MI claims would be paid
- Mean that, the more severe MI cases receive a full payment
- Mean that, cases of a less severe MI would still receive a significant level of payment
- Reduce the pressure on life offices to pay commercial claims
- Provide some 'future proofing' for claims costs against increasing MI diagnosis incidence

29

In conclusion

- Persisting with Troponin as a sole test of severity in the Heart Attack definition is Critically flawed
- Introducing a two-tier approach that means that all claims are paid is a step forwards
- Revising the definition to include a more tangible test of severity will be more equitable, achieve greater consistency, align with other conditions and provide a significant level of price future proofing

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.