



Canadian Agency for
Drugs and Technologies
In Health

RAPID RESPONSE REPORT: SUMMARY WITH CRITICAL APPRAISAL



TITLE: Point-of-care versus Central Laboratory Troponin Testing for Diagnosis of Acute Coronary Syndrome in Acute Care Settings: A Review of the Clinical and Economic Evidence

DATE: 18 October 2012

CONTEXT AND POLICY ISSUES

Acute coronary syndrome (ACS) refers to any group of symptoms attributed to the obstruction of the coronary arteries, and clinical presentations include ST-elevation myocardial infarction (STEMI), non-STEMI (NSTEMI) and unstable angina (UA).¹ Myocardial infarction (MI), which is defined by the presence of myocardial necrosis in combination with clinical evidence of myocardial ischemia, is caused by a perfusion imbalance between supply and demand within the coronary arteries as a result of an acute thrombotic process.¹ STEMI is diagnosed by electrocardiogram (ECG) abnormalities and has the highest risk of cardiac death, while NSTEMI patients may not contain ECG abnormalities but demonstrate ischemic symptoms.¹ Patients who exhibit clinical symptoms of ischemia with no evidence of myocardial necrosis are considered to have UA.¹ In 2006, approximately 935,000 people experienced an acute MI in the United States, 150,000 of which resulted in death.¹ Early detection and diagnosis of MI is crucial for the proper administration of therapy to limit cardiac damage and preserve cardiac function.¹

In the past, biochemical markers of cardiac damage caused by myocardial ischemia have included aspartate transaminase, plasma creatine kinase, lactate dehydrogenase, and specific isoenzymes of both creatine kinase and lactate dehydrogenase.² However, these biomarkers and developed assays have suffered from a lack of specificity.² In 2000, the European Society of Cardiology (ESC) and the American College of Cardiology (ACC) established cardiac troponin as the biomarker of choice in the diagnosis of MI.^{1,2} In 2007, a task force created by the ESC, ACC, and American Heart Association updated the definition of MI to include a rise and fall of troponin with at least one value above the 99th percentile of the upper reference limit in a healthy population.¹

Cardiac troponins are regulatory proteins that control the calcium-mediated interaction of actin and myosin, which results in contraction and relaxation of striated muscle. The troponin complex is made up of troponin C, troponin I (cTnI), and troponin T (cTnT). Both cTnI and cTnT are unique to cardiac muscle and levels of these proteins in the serum will rise when cardiomyocytes are damaged as a result of free cytoplasmic troponin being released followed

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by the dispersion of myofibril-bound troponin complexes.¹ Troponin can typically be detected approximately two to four hours after the onset of myocardial injury.¹

Rapid quantitative assays have been developed to detect elevations in cTnI and cTnT in the serum, but there are variations in the sensitivity and specificity of various troponin immunoassays.³ Conventional assays are adequate at detecting elevated troponin levels at the time of hospital admission, but sensitivity improves drastically several hours after admission. High-sensitivity assays have been developed that are increasingly able to detect MI at an early stage with greater diagnostic accuracy.¹ High-sensitivity assays are characterized by a total imprecision of $\leq 10\%$ at the 99th percentile and the ability to measure concentrations above the limit of detection in $>50\%$ of healthy individuals below the 99th percentile.⁴ Currently, only high sensitivity cTnT assays have been used in clinical practice.⁴ Point-of-care (POC) tests are normally less sensitive than laboratory-based assays.³ POC tests can be administered immediately in the emergency department, shortening turnaround time.^{5,6}

The purpose of this review is to compare the diagnostic test performance, clinical effectiveness, and cost-effectiveness of central laboratory troponin and point-of-care troponin assays, specifically for cTnI and cTnT biomarkers.

RESEARCH QUESTIONS

1. For patients with suspected acute coronary syndrome (ACS) in acute care settings, what is the diagnostic test performance of:
 - a. central laboratory troponin T compared with point-of-care troponin T assays?
 - b. central laboratory troponin I compared with point-of-care troponin I assays?
2. For patients with suspected ACS in acute care settings, what is the comparative clinical effectiveness of:
 - a. central laboratory troponin T compared with point-of-care troponin T assays?
 - b. central laboratory troponin I compared with point-of-care troponin I assays?
3. For patients with suspected ACS in acute care settings, what is the cost effectiveness of:
 - a. central laboratory troponin T compared with point-of-care troponin T assays?
 - b. central laboratory troponin I compared with point-of-care troponin I assays?

KEY MESSAGE

POC troponin I testing decreased the length of stay in the emergency department compared to central laboratory troponin I testing. Central laboratory troponin testing was found to have better diagnostic accuracy than conventional POC troponin assays. However, POC troponin assay results correlated well with the results of central laboratory troponin assays.

METHODS

Literature Search Strategy

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2012, Issue 9), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused

Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2002 and September 19, 2012.

Selection Criteria and Methods

One reviewer screened the titles and abstracts of the retrieved publications and evaluated the full-text publications for the final article selection, according to selection criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients with chest pain or suspected ACS presenting to the emergency department or other acute care settings (rural hospitals, remote area medical clinics, nursing posts)
Intervention	Point-of-care cardiac troponin T testing Point-of-care cardiac troponin I testing
Comparator	Central lab cardiac troponin T testing Central lab cardiac troponin I testing
Outcomes	Diagnostic test performance: sensitivity, specificity, accuracy, positive predictive value (PPV), negative predictive value (NPV), area under receiver operator curve (AUROC) Clinical outcomes: thromboembolic events, acute cardiovascular events, chronic/non-acute cardiovascular events, revascularization procedures, heart failure, quality of life, death, 30-day readmission rate, 30-day recurrence rate, 30-day mortality, harms Economic: quality of life, ICER, cost per outcome unit, cost/QALY
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials (RCTs), observational studies, and economic evaluations.

Exclusion Criteria

Studies were excluded if they did not meet the selection criteria, were duplicate publications or included in a selected systematic review, or were published prior to 2002.

Critical Appraisal of Individual Studies

RCT and non-randomized study quality were evaluated using the Downs and Black instrument.⁷ Studies of diagnostic accuracy were assessed for quality using the QUADAS tool.⁸ A numeric score was not calculated for each study. Instead, strengths and weaknesses of each study were summarized and described. No health technology assessments, systematic reviews or economic studies were identified for critical appraisal.

SUMMARY OF EVIDENCE

Quantity of Research Available

The literature search yielded 155 citations. Upon screening titles and abstracts, 149 citations were excluded and six potentially relevant articles were retrieved for full-text review. Two additional reports were identified through grey literature searching. Of the eight potentially relevant reports, three did not meet the inclusion criteria. Five publications were included in this review. The study selection process is outlined in a PRISMA flowchart (Appendix 1). One cluster RCT, two retrospective studies and two prospective observational studies met inclusion criteria. No economic evaluations were identified.

Summary of Study Characteristics

A detailed description of individual study characteristics is provided in Appendix 2.

Study design and country of origin

One cluster RCT,⁹ two retrospective studies^{10,11} and two prospective observational studies^{12,13} were included. The cluster RCT⁹ and one prospective observational study¹² was from Australia. One prospective observational study was from the US.¹³ One retrospective study came from each of Denmark¹⁰ and Sweden.¹¹

Study setting

The cluster RCT was conducted at two emergency departments in Australia that did not contain a chest pain observation unit.⁹ Patients at intermediate risk are referred to the cardiology unit as an inpatient for further evaluation.⁹ Two studies were conducted in the emergency department and the coronary care unit of a hospital.^{10,12} Another study was conducted at a university medical center.¹³ One study did not specify what type of facility it was conducted in beyond the emergency department.¹¹

Patient characteristics

The cluster RCT included patients over the age of 25 who presented to the emergency department with possible ACS and had troponin tests ordered.⁹ One retrospective study included patients with ages ranging from 27 to 96 years presenting at the emergency department with chest pain who had blood sample drawn on admission and after 6-9 hours that were stored at -80 °C.¹⁰ Another retrospective study included patients presenting at the emergency department who had both POC and central lab troponin analysis requested as part of the clinical workup.¹¹ The prospective observational studies included patients with a median age of 62 years presenting at the emergency department with cardiac chest pain that were suspected of ACS.^{12,13}

Index and reference tests

Four studies used POCT and central laboratory testing to analyze cTnI levels.^{9-11,13} One study used POC and central laboratory testing to analyze cTnT levels.¹² For POC testing, three studies used the i-Stat cTnI assay (Abbott Laboratories),^{9,11,13} one study used the Stratus CS cTnI assay (Siemens Healthcare Diagnostics),¹¹ one study used the AQT90 FLEX TnI assay

(Radiometer Medical ApS),¹⁰ and one study used a third generation quantitative cTnT assay (Roche Diagnostics).¹² For central laboratory testing, three studies used the Access AccuTnI assay (Beckman Coulter),⁹⁻¹¹ one study used the Abbott cTnI ADV assay (Abbott Laboratories),¹⁰ one study used the Architect cTnI assay (Abbott Laboratories),¹¹ one study used the TnI-Ultra (Siemens Medical Solutions Diagnostics),¹³ and one study used a third generation quantitative cTnT assay (Roche Diagnostics).¹² The cluster RCT did not employ a reference standard.⁹ One study used cTnT levels, clinical symptoms, and ECG data to define MI as a reference standard.¹⁰ Another study used death by cardiovascular disease (CVD) as determined from a registry as a reference standard.¹¹ Two studies used results from the central laboratory troponin assay as a reference standard.^{12,13}

Outcomes measured

The cluster RCT reported the length of stay of patients from physical arrival to departure from the emergency department.⁹ All of the other included studies reported the sensitivity, specificity, PPV and NPV of the diagnostic tests.¹⁰⁻¹³ One study also reported AUROC,¹⁰ and one study also reported positive and negative likelihood ratios (LR).¹¹

Summary of Critical Appraisal

A summary of critical appraisal of individual studies can be found in Appendix 3.

The cluster RCT employed a large sample size (n=1,194) and performed an intention to treat analysis, with patients were analyzed according to the week of randomization and not whether they had troponin measured with POC or central lab testing.⁹ This issue was rectified with a per-protocol analysis, which had similar results. The method of randomization and losses to follow-up were described. However, not all of the patients randomized to POC testing when received that test, as it was not mandatory and many patients and staff opted for central lab testing. The specific institutions that implemented this study may limit generalizability due to specific protocols that may not apply to other hospitals such as discharging patients straight to inpatient beds.

All of the diagnostic accuracy studies explicitly described the inclusion and exclusion criteria.¹⁰⁻¹³ Patients received both index and reference test in all but one study,¹³ where the reference test was only given if patients gave an elevated cTnI POC assay reading. The reference standard varied between studies, with only one studying using comprehensive evidence of MI as a reference standard.¹⁰ The other diagnostic accuracy studies used death by CVD¹¹ or the results from central laboratory troponin assays^{12,13} as reference standards, which would not be specific enough for a diagnosis of MI. As central laboratory troponin assays were an index test of interest for this review, studies using this assay to establish the diagnosis of MI or ACS have an unclear risk of bias. Both index and reference tests were performed within 24 hours in one study,¹² was not specified in one study,¹³ and was performed on frozen samples within five to six years in one study.¹⁰ Two studies were retrospective in nature, not allowing for a final diagnosis to be made independent of results.^{10,11} In all of the diagnostic accuracy studies, it was not possible to be blinded to the test characteristics and it was unclear whether different people conducted the various tests.

Summary of Findings

Detailed findings from each individual study can be found in Appendix 4.

Troponin I tests

The cluster RCT found that there was an average length of stay in the emergency department of 7 hours when central laboratory cTnI testing was used.⁹ This length of stay was reduced by an average of 48 minutes with the use of cTnI POC testing, but this difference was not statistically significant. The percentage of patients with a less than 8 hour length of stay was statistically significantly greater when POC testing was used when compared to central laboratory testing.

One retrospective study that used specific criteria to define MI as a reference standard found that the POC assay (AQT90 FLEX TnI) was similar in diagnostic performance to one of the central laboratory assays (Abbott cTnI ADV), but was inferior to another central laboratory assay (Access AccuTnI) when a blood sample taken at admission was analyzed.¹⁰ The diagnostic performance of the POC assay decreased when a blood sample taken 6 to 9 hours after admission was used, while the diagnostic performance of both central laboratory assays improved, making the central laboratory assays superior to the POC assay at this time point.

One retrospective study that used death by CVD as a reference standard found that the two central laboratory assays (Architect cTnI, Access AccuTnI) had significantly greater sensitivities and diagnostic accuracies than the two POCTs (Stratus CS cTnI, i-Stat cTnI) and were able to predict significantly more deaths by CVD.¹¹ The specificities, however, were inversely proportional to sensitivity but were not significantly different between POC and central laboratory testing. The central laboratory assays identified significantly more deaths by CVD than the POC assays.

One prospective observational study that used central laboratory test results (TnI-Ultra) as a reference standard found that the POC assay (i-Stat cTnI) provided results that were concordant with the central laboratory results.¹³ Only the patients who had elevated troponin levels from the POC assay were retested using the central laboratory assay. Of the patients that were retested, 4.5% retested negative using the central laboratory assay. A random selection of patients that tested negative with the POC assay were retested with the central laboratory assay and 5.8% were found to be positive.

Troponin T tests

One prospective observational study that used central laboratory testing (Elecsys 2010) as the reference standard found that the POC assay (third generation quantitative cTnT assay) correlated well with the central laboratory test.¹² The sensitivity of the POC test was lower than that of the central laboratory test, which may have been attributed to the underperformance of the test in detecting cTnT concentrations between 0.03 and 0.10 ng/mL.

Cost-effectiveness

No evidence on the cost effectiveness of central laboratory troponin tests compared with point-of-care troponin tests was identified.

Limitations

The reference standards employed in three studies were not comprehensive criteria for a diagnosis of acute MI. In addition, the reference standard varied between studies, limiting the comparability of results between studies. Troponin assays from different manufacturers were used between studies, further limiting the comparability. One retrospective study analyzed blood samples several years after collection after freezing and thawing, which may not be representative of real-life settings. Only one study was identified that looked at cTnT specifically and no studies were identified that specifically looked at high sensitivity assays. There was a lack of evidence in the identified studies regarding clinical outcomes or impact on patient management as a result of using POC versus central laboratory troponin testing. No cost-effectiveness analyses were identified.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

The use of POC troponin I testing was found to increase the number of patients with a less than 8 hour length of stay in the emergency department compared with central laboratory testing.

According to the included diagnostic accuracy studies, conventional POC troponin I assays were inferior to central laboratory troponin I assays at predicting acute MI, especially when blood samples were taken several hours after hospital admission. In addition, central laboratory troponin I assays had better sensitivity and diagnostic accuracy than conventional POC troponin I assays in predicting death by cardiovascular disease. Cardiac troponin I and troponin T studies that employed central laboratory troponin assays as a reference standard generally found that POC troponin assays correlated well with the results of central laboratory assays. Therefore, POC testing may be a useful tool to rule out negative cases in the emergency setting.

No evidence was identified regarding the cost effectiveness of central laboratory troponin testing versus point-of-care testing.

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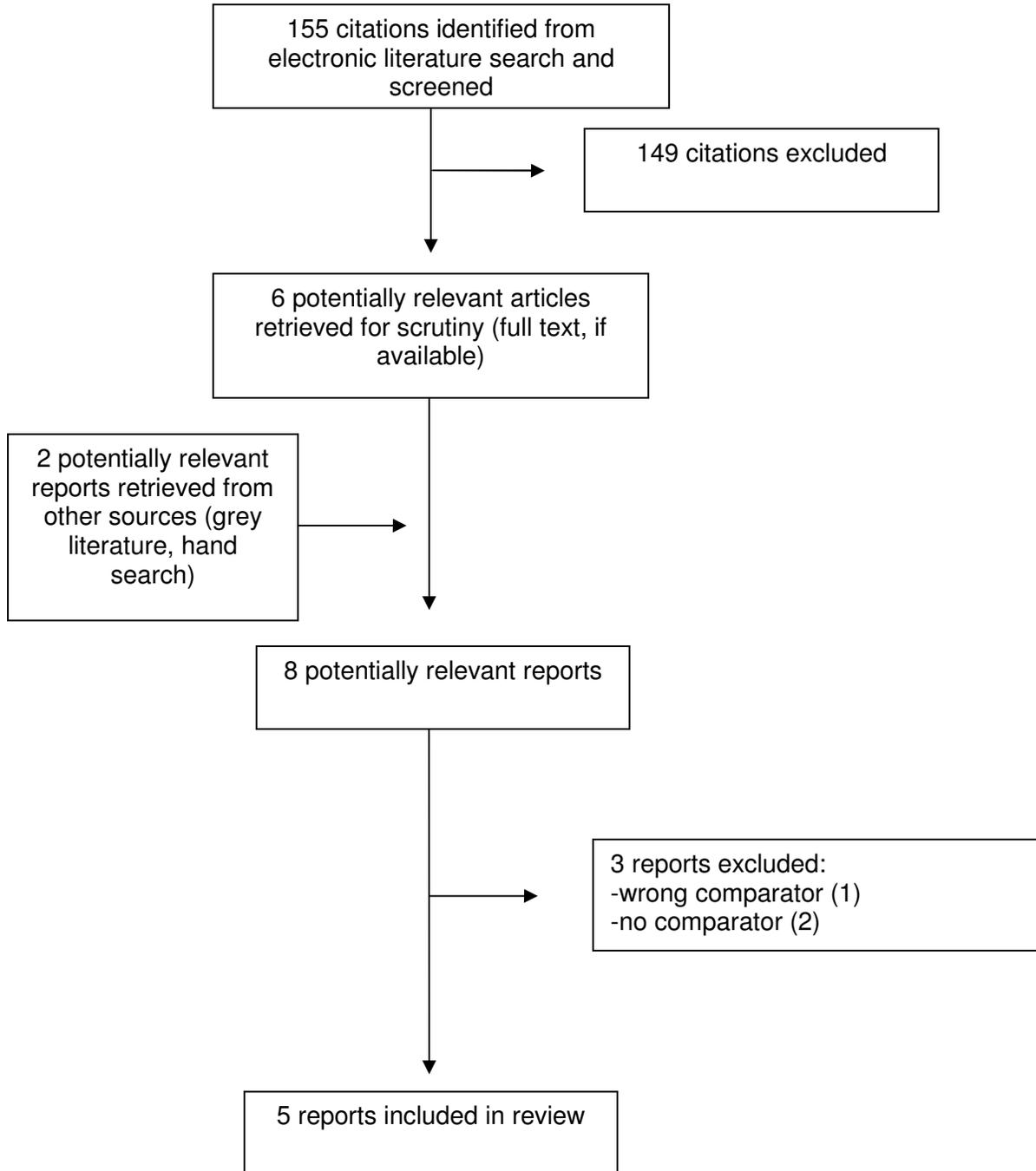
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APPENDIX 1: Selection of Included Studies



APPENDIX 2: Summary of Study Characteristics

First Author, Publication Year, Country	Study Design and Length	Patient Characteristics	Index Test(s)	Reference Test	Clinical Outcomes Measured
Troponin I					
Loten ⁹ 2010 Australia	Cluster RCT (computer generated) 12 weeks	1194 consecutive patients >25 years old presenting at the ED with possible ACS (at two Australian ED's)	<u>POCT</u> i-Stat (Abbott Laboratories) n=467 (median age 60 years, range 25-101 years; 52.2% male) <u>Central Lab</u> Access AccuTnl assay (Beckman Coulter) n=445 (median age 62 years, range 25-99 years; 49.7% male)	N/A	Length of stay (physical arrival to departure from the ED)
Hjortshøj ¹⁰ 2011 Denmark	Retrospective analysis Blood samples collected Feb 2003-Oct 2004, analyzed Jan 2009	458 patients presenting at the ED with chest pain (mean age 63 years, range 27-96 years; 64% male) Blood samples taken on arrival (first sample) and after 6-9 hours (second sample)	<u>POCT</u> AQT90 FLEX Tnl (Radiometer Medical ApS) <u>Central Lab</u> Access AccuTnl assay (Beckman Coulter) Abbott cTnl ADV assay (Abbott Diagnostics)	Acute MI defined as the rise and/or fall of cTnT > 0.03 µg/L with signs of ischemia (clinical, ECG)	Sensitivity, specificity, PPV, NPV, AUROC
Venge ¹¹ 2010 Sweden	Retrospective analysis Blood samples collected Nov 2004-May 2005 and Oct 2006-May 2007	1069 patients presenting at the ED who had troponin analysis requested as part of the clinical workup (53% men)	<u>POCT</u> Stratus CS (Siemens Healthcare Diagnostics) - whole blood i-Stat (Abbott Laboratories) - heparinized blood <u>Central Lab (heparinized blood)</u> Architect cTnl (Abbott Laboratories) Access AccuTnl (Beckman Coulter) - frozen N=859 (patients who were analyzed by all 4 assays)	Death from CVD as determined from a Swedish death registry	Sensitivity, specificity, PPV, NPV, Positive LR, Negative LR, accuracy

First Author, Publication Year, Country	Study Design and Length	Patient Characteristics	Index Test(s)	Reference Test	Clinical Outcomes Measured
Troponin T					
Hallani ¹² 2005 Australia	Prospective observational Mar 2001-Mar 2002	133 unselected patients presenting at the ED or Coronary Care Unit with possible cardiac chest pain (mean age 62±14 years; 62% male)	<u>POCT</u> Third generational quantitative cTnT (Roche Diagnostics) – performed immediately after blood collection	<u>Central Lab</u> Elecsys 2010 immunoassay analyzer (Roche Diagnostics) – performed using refrigerated serum within 24 h of collection	Sensitivity, specificity, PPV, NPV, accuracy

ACS=acute coronary syndrome; AUROC=area under receiver operator curve; cTnI=cardiac troponin I; cTnT= cardiac troponin T; CVD=cardiovascular disease; ECG=electrocardiogram; ED=emergency department; LR=likelihood ratio; MI=myocardial infarction; NPV=negative predictive value; POCT=point of care testing; PPV=positive predictive value; RCT=randomized controlled trial; TnI=troponin I; TnT=troponin T

APPENDIX 3: Summary of Critical Appraisal

First Author, Publication Year, Study Design	Strengths	Limitations
Troponin I		
Loten ⁹ 2010 Clustered RCT	<ul style="list-style-type: none"> • Large sample size (n=1194) • Intention to treat analysis was performed • Method of randomized was described • Losses to follow-up described 	<ul style="list-style-type: none"> • Not all patients received testing as it was not mandatory • Specific institutions involved in this study may differ from others as patients were discharged straight to inpatient beds, limiting generalizability
Hjortshøj ¹⁰ 2011 Retrospective analysis	<ul style="list-style-type: none"> • Selection criteria clearly described • All patients received both index and reference test • Index test described in sufficient detail to permit replication • Final diagnosis likely to correctly classify the condition 	<ul style="list-style-type: none"> • Study was retrospective • Extended period of time between reference standard and index test • Unclear whether reference and index test results were interpreted independently from one another
Venge ¹¹ 2010 Retrospective analysis	<ul style="list-style-type: none"> • Large sample size (n=1069) • A consecutive sample of patients were enrolled • All patients received both index and reference test • Index test described in sufficient detail to permit replication 	<ul style="list-style-type: none"> • Study was retrospective • Reference standard (death by CVD) not specific enough to identify condition (myocardial infarction)
Bock ¹³ 2008 Prospective observational	<ul style="list-style-type: none"> • Large sample size (n=5909) • Prospective study 	<ul style="list-style-type: none"> • Not all patients received both index and reference test • Unclear how much time passed between reference and index test • Reference test was only given if patients gave an elevated POCT reading, and to some patients who gave negative POCT readings • No diagnosis or outcome was followed
Troponin T		
Hallani ¹² 2005 Prospective observational	<ul style="list-style-type: none"> • Prospective study • All patients received both index and reference test • Short time period between index and reference tests • Index test described in sufficient detail to permit replication 	<ul style="list-style-type: none"> • Reference standard was central laboratory Tnl levels and not an objective measure of myocardial infarction • Unclear whether reference and index test results were interpreted independently from one another

APPENDIX 4: Summary of Findings

First Author, Publication Year, Study Design	Main Study Findings	Authors' Conclusions
Troponin I		
<p>Loten⁹ 2010</p> <p>Clustered RCT</p>	<p>ITT analysis</p> <p><u>Median length of hospital stay</u> i-Stat (POCT): 6.4 h AccuTnl assay (Central Lab): 7.2 h P=0.063</p> <p><u>Percentage <8 h LOS</u> i-Stat (POCT): 71 AccuTnl assay (Central Lab): 60 P=0.007</p>	<p>“There was a non-significantly shorter LOS for those allocated to the POC group, particularly in the setting where central laboratory services are not available 24 h a day; this effect reached significance when LOS was measured as percentage discharged within 8 h rather than as a continuous variable, and remained significant after adjusting for clustering by site and week.” (p. 197)</p>
<p>Hjortshøj¹⁰ 2011</p> <p>Retrospective analysis</p>	<p>First blood sample (taken on arrival)</p> <p><u>Sensitivity, % (95% CI)</u> AQT90 FLEX Tnl: 58 (47-69) Access AccuTnl assay: 88 (77-95), P<0.001 Abbott cTnl ADV assay: 69 (57-79)</p> <p><u>Specificity, % (95% CI)</u> AQT90 FLEX Tnl: 94 (91-96) Access AccuTnl assay: 84 (79-88) Abbott cTnl ADV assay: 94 (90-96)</p> <p><u>PPV, % (95% CI)</u> AQT90 FLEX Tnl: 71 (58-81) Access AccuTnl assay: 60 (48-69) Abbott cTnl ADV assay: 74 (62-83)</p> <p><u>NPV, % (95% CI)</u> AQT90 FLEX Tnl: 90 (86-93) Access AccuTnl assay: 96 (93-98) Abbott cTnl ADV assay: 92 (89-95)</p> <p><u>AUROC, % (95% CI)</u> AQT90 FLEX Tnl: 90 (86-92) Access AccuTnl assay: 93 (90-96) Abbott cTnl ADV assay: 92 (89-94)</p> <p>Second blood sample (taken 6-9 h after arrival)</p> <p><u>Sensitivity, % (95% CI)</u> AQT90 FLEX Tnl: 85 (75-92) Access AccuTnl assay: 98 (91-100), P<0.02 Abbott cTnl ADV assay: 96 (89-99)</p> <p><u>Specificity, % (95% CI)</u> AQT90 FLEX Tnl: 91 (87-94) Access AccuTnl assay: 78 (73-83) Abbott cTnl ADV assay: 91 (88-94)</p> <p><u>PPV, % (95% CI)</u> AQT90 FLEX Tnl: 71 (61-80) Access AccuTnl assay: 53 (43-62)</p>	<p>“This study shows that diagnostic performance on admission, with respect to the diagnosis of AMI, of the POCT based AQT90 FLEX Tnl was equivalent to the Abbott AxSYM ADV cTnl assay, but inferior to the AccuTnl assay. After 6-9 h, both the central laboratory based assays were superior compared to the AQT90 FLEX Tnl POCT assay. The negative predictive value was high for the AQT90 FLEX Tnl assay on admission making the assay suitable as a possible rule out marker in the POCT setting. However, this should be interpreted with caution due to a borderline negative likelihood ratio and the fact that no outcome data exists on patients with negative tests.” (p. 375)</p>

First Author, Publication Year, Study Design	Main Study Findings	Authors' Conclusions
	<p>Abbott cTnl ADV assay: 74 (64-82)</p> <p><u>NPV, % (95% CI)</u> AQT90 FLEX Tnl: 96 (93-98) Access AccuTnl assay: 99 (97-100) Abbott cTnl ADV assay: 99 (97-100)</p> <p><u>AUROC, % (95% CI)</u> AQT90 FLEX Tnl: 95 (92-97) Access AccuTnl assay: 97 (94-98) Abbott cTnl ADV assay: 96 (93-98)</p>	
<p>Venge¹¹ 2010</p> <p>Retrospective analysis</p>	<p><u>Sensitivity, % (95% CI)</u> Stratus CS: 54 (44-64) i-Stat: 43 (34-52) Architect cTnl: 82 (73-89) Access AccuTnl: 86 (77-92)</p> <p><u>Specificity, % (95% CI)</u> Stratus CS: 78 (74-81) i-Stat: 85 (82-87) Architect cTnl: 72 (68-75) Access AccuTnl: 57 (53-61)</p> <p><u>Accuracy, % (95% CI)</u> Stratus CS: 66 (63-69) i-Stat: 64 (61-67) Architect cTnl: 77 (74-80) Access AccuTnl: 72 (69-75)</p> <p><u>PPV, % (95% CI)</u> Stratus CS: 25 (19-31) i-Stat: 33 (26-41) Architect cTnl: 28 (23-34) Access AccuTnl: 21 (17-26)</p> <p><u>NPV, % (95% CI)</u> Stratus CS: 93 (90-95) i-Stat: 89 (87-92) Architect cTnl: 97 (95-98) Access AccuTnl: 97 (95-98)</p> <p><u>Positive LR (95% CI)</u> Stratus CS: 2.4 (1.9-3.1) i-Stat: 2.8 (2.1-3.7) Architect cTnl: 2.9 (2.5-3.4) Access AccuTnl: 2.0 (1.8-2.3)</p> <p><u>Negative LR (95% CI)</u> Stratus CS: 0.59 (0.47-0.74) i-Stat: 0.68 (0.58-0.79) Architect cTnl: 0.25 (0.16-0.39) Access AccuTnl: 0.25 (0.15-0.41)</p> <p><u>AUROC (95% CI)</u> Stratus CS: 0.744 (0.708-0.777) i-Stat: 0.710 (0.673-0.745) Architect cTnl: 0.758 (0.723-0.791) Access AccuTnl: 0.766 (0.731-0.798)</p>	<p>“The highest sensitivity was seen with the Access AccuTnl assay and the lowest sensitivity with i-Stat cTnl. No differences in sensitivities between the 2 laboratory assays or between the 2 POC assays were seen, whereas the differences in diagnostic sensitivities between the laboratory and POC assays were highly significant (P<0.001). The specificities of the assays varied between 57% and 85% and inversely to the sensitivities. The highest diagnostic accuracy was seen with Architect cTnl, but was not significantly different from that of Access AccuTnl. The diagnostic accuracies were similar between the POC assays but lower than those of the laboratory assays (P<0.001).” (p. 838)</p>

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<p>Bock¹³ 2008</p> <p>Prospective observational</p>	<p><u>Percentage of Death by CVD Predicted, %</u> Stratus CS: 50 i-Stat: 50% Architect cTnl: 81% Access AccuTnl: 88</p> <p>Of the 137 randomly selected samples that were negative by i-Stat (POCT), 8 (5.8%) were elevated when using Tnl-Ultra (central lab).</p> <p><u>Sensitivity, %</u> i-Stat: 63.3</p> <p><u>Specificity, %</u> i-Stat: 99.5</p> <p>Calculated using the entire sample of elevated iStat results:</p> <p><u>PPV, % (95% CI)</u> i-Stat: 95.5 (93.4-97.0)</p> <p>Calculated using random sample of 137 negative Tnl-Ultra results:</p> <p><u>NPV, % (95% CI)</u> i-Stat: 94.2 88.5-97.3)</p>	<p>"The present study suggests that a widely used POC method for cTnl, the Abbott i-STAT (Tn-P), can provide rapid patient classification that is usually concordant with that provided by a recent-generation central laboratory assay, the Siemens ADVIA Centaur Tnl-Ultra (Tn-U). Of the specimens with elevated troponin according to the Tn-P, 4.5% were negative by Tn-U, but most of these exceeded the Tn-P threshold only minimally. Only 1.0% of specimens with a Tn-P result of more than 0.2 ng/mL (0.2 µg/L) were negative by Tn-U." (p. 134)</p>
Troponin T		
<p>Hallani¹² 2005</p> <p>Prospective observational</p>	<p><u>Sensitivity, %</u> POCT: 75</p> <p><u>Specificity, %</u> POCT: 100</p> <p><u>PPV, % (95% CI)</u> POCT: 100</p> <p><u>NPV, % (95% CI)</u> POCT: 95</p> <p><u>Accuracy, % (95% CI)</u> POCT: 95</p>	<p>"Our results compare well with previously published data and show good correlation between the two tests. However, the sensitivity of POCT was only 75% (based on a detection threshold of 0.03 ng/mL). This was attributable to the underperformance of the test in detecting cTnT concentration between 0.03 and 0.10 ng/mL." (p. 562)</p>

AMI=acute myocardial infarction; AUROC=area under receiver operator curve; CI=confidence interval; LOS=length of stay; LR=likelihood ratio; NPV=negative predictive value; PPV=positive predictive value; Tnl=troponin I