



## MEDICO RESEARCH CHRONICLES

ISSN NO. 2394-3971

DOI No. 10.26838/MEDRECH.2022.9.6.660

Contents available at [www.medrech.com](http://www.medrech.com)

### POINT OF CARE TESTING (POCT)-A BOON TO EMERGENCY DEPARTMENT: A CLINICAL REVIEW

**Dr. Mohammed Shabbir P**

*HOD, Department of Emergency Medicine,*

*NMC royal hospital, Sharjah. UAE.*

#### ARTICLE INFO

##### Article History

**Received: November 2022**

**Accepted: December 2022**

**Key Words:** POCT, Morbidity, Mortality, Critical patient, Clinical Outcome.

##### Corresponding author

M. Shabbir P.\*

#### ABSTRACT

Point of care testing (POCT), otherwise referred to as near patient, bedside, or extra laboratory testing, is not new. These are the tests done in which results can be obtained in less than 30 minutes. The effect of point of care testing can be assessed in terms of the benefit to the diagnostic or treatment strategy and thus overall health outcome. It is almost axiomatic that providing a more rapid result saves time and therefore money. However, there will be no saving unless the result is acknowledged and action taken. The technology now exists to enable a wide range of diagnostic tests to be provided at the point of care. The need for such testing clearly exists and will increase as the practice of Emergency medicine changes and individuals take greater responsibility for the patient health. Rapid provision of results can facilitate better clinical decision making, improved patient adherence, and greater patient satisfaction, all of which lead to improved clinical outcomes and shortens the hospital stay there by reduces the economic burden.

#### REVIEW ARTICLE

2022, [www.medrech.com](http://www.medrech.com)

#### INTRODUCTION:

Point of care testing (POCT), otherwise referred to as near patient, bedside, or extra laboratory testing, is not new. These are the tests done in which results can be obtained in less than 30 minutes. Many of the early “diagnostic tests” were first done at the bedside, for example, urine testing. Over the past few years, however, there have been development in analytical system to include many more critical tests which can be utilized in acute care settings which help in making critical decisions fast and timely there by

accurate management of the patient can be done without delay to reduce the morbidity and mortality of critical patients.

The key objective of point of care testing is to generate a result quickly so that appropriate treatment can be initiated in the department of Emergency Medicine, leading to an improved clinical and or economic outcome This article sets out the importance of POCT in Emergency Department for the delivery of effective, appropriate and quick treatment which is crucial in critical patients to

prevent morbidity, mortality and economic burden.

The POCT tests done in our department are:

- Blood gas analysis
- Electrolytes levels
- Capillary Glucose levels.
- Pregnancy test
- D dimer levels
- B-type natriuretic peptide levels
- Serum Lactate levels.
- Blood ketones.
- Troponins
- Urine dipstick test.

#### **ADVANTAGES:**

The effect of point of care testing can be assessed in terms of the benefit to the diagnostic or treatment strategy and thus overall health outcome.<sup>5</sup> Some examples of clinical outcomes mentioned below. Any test will be beneficial only if appropriate action is taken on the result. Thus, the rate limiting step is reducing length of hospital stay and better clinical outcome. The benefit may not be delivered just by test result,<sup>6</sup> but acknowledgement of the result (communication, appreciation, and action).<sup>7</sup>

Few formal studies have linked the use of point of care testing to outcomes.<sup>8</sup> In some situations the natural course of the disease or an acute clinical episode suggests that rapid provision of the test result would be beneficial—that is, there is evidence of outcome by association. such examples are tests to measure blood gas and electrolyte concentrations in patients in Diabetic Keto acidosis, Acute respiratory failure and to measure blood Troponin levels in patients with Acute Myocardial Infarction.

Emergency Department Point of care tests have great potential for facilitating faster decision making and therefore more effective patient triage in the Emergency department. The main studies in Emergency Department have been on tests for measuring blood gas and electrolyte concentrations.<sup>6</sup> Rapid analysis

of cardiac markers may improve the recognition of patients who will benefit from early treatment as well as those who are at greatest risk of a later cardiac event.<sup>20</sup> Similarly, point of care tests for d-dimer can help identify patients at risk of a pulmonary embolism or deep vein thrombosis, with improved outcomes.<sup>21</sup> Recent evidence also suggests that early availability of serum protein S100 (a marker of brain damage) results in patients with head injury improves clinical outcome.<sup>2</sup>

Some examples of improved clinical outcomes from using point of care testing

Outcome

- Faster decision-making Starting treatment earlier
- Improved adherence to treatment Reduced incidence of complications
- Quicker optimization of treatment Reduced reoperation or readmission rate
- Patient satisfaction

For Example, Patients with Myocardial infarction, Diabetes Mellitus complications, Acute or Chronic Respiratory failure, drug overdose, Acute Pulmonary Embolism, Sepsis with Septic Shock, Acute or Chronic Kidney Disease, Electrolyte disorders, Complicated Ectopic Pregnancy etc. are few to mention.

#### **Economics:**

It is almost axiomatic that providing a more rapid result saves time and therefore money. However, there will be no saving unless the result is acknowledged and action taken. The economic benefit of point of care testing can be judged in terms of the short-term gain from more effective use of resources in the immediate episode of care. For example, use of point of care testing to assess coagulation status and platelet function has been shown to reduce the requirement for blood products, with Despotis et al estimating that it could save over \$250 000 (£170 000) a year in their institution.<sup>25</sup>

The long-term gain is reflected in societal benefits, which have to be measured

through quality-of-life indices—for example, prolonged life years or work years gained. Little formal data exist on quality of life, although the finding that point of care testing in diabetes delays the onset of complications implies economic and wider societal benefit.

Reduction in the length of hospital stay has been seen as one of the main advantages of point of care testing. The rapid availability of a result reduces the time to make decisions, thereby allowing more rapid triage, treatment, or discharge. In addition, point of care testing can be used to guide whether a patient need admitting to hospital, as has been suggested for patients with chest pain.<sup>26</sup>

Few studies have examined economic outcomes, although many studies have shown that point of care testing is more expensive than the laboratory equivalent.<sup>13</sup> This is not unexpected because point of care testing loses the potential benefits of the economy of scale (automation, etc.) in a central laboratory. Studies of economic outcomes are needed in which the results of tests are acted on quickly and the economics of the complete patient episode are built into the assessment.

Point of care tests will become widely used only if the potential savings can be realized. In short term, point of care testing can help to reduce the length of hospital stay. In the longer term, use of these tests to improve patient management and therefore reduce the disease burden will also benefit the healthcare system.

To have point of care service in Emergency Department following points must be considered

Organization of point of care testing service

- Identify the clinical need
- Prepare a detailed specification
- Analyze costs and benefits
- Survey technology available (and its performance)
- Procure equipment and consumables
- Ensure equipment can be connected to laboratory information system

- Train all users of point of care testing system
- Provide certification for competent operators
- Regularly monitor quality control and document performance
- Document any problems
- Enter result in patient record
- Notify requester of result
- Act appropriately on result
- Provide continuing education and recertification
- Audit use and problems and take appropriate action.

Some examples of economic outcomes from use of point of care testing

- Reduced number of clinic visits
- Reduced length of hospital stays
- Earlier discharge from hospital
- Fewer unnecessary hospital admissions
- Better optimized drug treatment
- Less inappropriate use of drugs
- Reduced use of blood products
- Reduced use of staff, equipment, and estate
- Improved quality of life.

#### **CONCLUSION:**

The technology now exists to enable a wide range of diagnostic tests to be provided at the point of care. The need for such testing clearly exists and will increase as the practice of Emergency medicine changes and individuals take greater responsibility for the patient care. Rapid provision of results can facilitate better clinical decision making, improved patient adherence, and greater patient satisfaction, all of which lead to improved clinical outcomes and shortens the hospital stay there by reduces the economic burden. Although the cost of producing a result at the point of care may be greater than for laboratory testing, point of care tests has wider patient, operational, economic, and societal benefits.

#### **AUTHOR'S RECOMMENDATION:**

Every Emergency Department must use Point of care testing in critical patients so

that appropriate and timely care is provided to the needy patients,

#### REFERENCES:

- Price CP, Hicks JM, eds. Point-of-care testing. Washington: AACC Press, 1999.
- England JM, Hyde K, Lewis SM, Mackie IJ, Rowan RM, et al. Guidelines for near-patient testing: hematology. Clin Lab Haem 1995; 17:300-9.
- Crook MA. Near patient testing and pathology in the new millennium. J Clin Pathol 2000; 53:27-30.
- Burnett D, Freedman D. Near-patient testing: the management issues. Health Services Management. 1994;3:10-2.
- Price CP. Evidence based laboratory medicine: supporting decision making. Clin Chem 2000; 46:1041-50.
- Kendall J, Reeves B, Clancy M. Point of care testing: randomized, control- led trial of clinical outcome. BMJ 1998; 316:1052-7.
- Scott MG, Faster is better-it's rarely that simple: Clin Chem 2000;46:441-2
- Hobbs FDR, Delaney BC, Fitzmaurice DA, Wilson S, Hyde CJ, Thorpe GH, et al. A review of near patient testing in primary care. Health Technol Assess 1997; 1:1-230.
- Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. N Engl J Med 1993; 329:977-86.
- UKPDS Group. Intensive blood glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). Lancet 1998; 352:837-53.
- Gallichan M. Self-monitoring of glucose by people with diabetes: evidence based practice. BMJ 1997; 314:964.
- Langer O, Rodriguez DA, Xenakis EM, McFarland MB, Berkus, MD, Arrendondo F, et al. Intensified versus conventional management of gestational diabetes. Am J Obstet Gynecol 1994; 170:1036-47.
- Grieve R, Beech R, Vincent J, Mazurkiewicz, J. Near patient testing in diabetes clinics: appraising the costs and outcomes. Health Technol Assess 1999; 3:1-74.
- Sawicki PT. A structured teaching and self-management program for patients receiving oral anticoagulation. JAMA 1999; 281:145-50.
- Rink E, Hilton S, Szczepura A, Fletcher J, Sibbald B, Davies C, et al. Impact of introducing near patient testing for standard investigations in general practice. BMJ 1993; 307:775-8.
- Fenwick EAL, Briggs AH, Hawke CI. Management of Urinary Tract Infection in general practice: a cost-effectiveness analysis. Br J Gen Pract 2000; 50:635-9.
- Jones R, Phillips I, Felix H, Tait C. An evaluation of near-patient testing for Helicobacter pylori in general practice. Aliment Pharmacol Ther 1997; 11:101-5.
- Dahler-Eriksen BS, Lauritzen T, Lassen JF, Lund ED, Brandslund I. Near-patient test for C-reactive protein in general practice: assessment of clinical, organizational, and economic outcomes. Clin Chem 1999; 45:478-85.
- Griffin S. Diabetes care in general practice: meta-analysis of randomized control trials. BMJ 1998; 317:390-6.
- Storrow AB, Gibler WB. The role of cardiac markers in the emergency department. Clin Chim Acta 1999; 284:187-96.
- Wells PS, Brill-Edwards P, Stevens P, Panju A, Patel A, Douketis I, et al. A novel and rapid whole-blood assay for D-dimer in patients with clinically

- suspected deep vein thrombosis. *Circulation* 1995; 91:2184-7.
- Jackson RGM, Samra GS, Radcliffe J, Clark GH, Price CP, et al. Early fall in levels of S-100 $\beta$  in traumatic brain injury. *Clin Chem Lab Med* 2000; 38:1165-7.
  - Despotis GJ, Joist JH, Goodnough LT. Monitoring of hemostasis in cardiac surgical patients: impact of point-of-care testing on blood loss and transfusion outcomes. *Clin Chem* 1997; 43:1684-96.
  - Irvin GL, Molinari AS, Figueroa C, Carneiro, DM. Improved success rate in reoperative parathyroidectomy with intraoperative PTH assay. *Ann Surg* 1999; 229:874-9.
  - Despotis GJ, Grishaber JE, Goodnough LT. The effect of an intraoperative treatment algorithm on physicians' transfusion practice in cardiac surgery. *Transfusion* 1994; 34:290-6.
  - Brogan GX, Bock JL. Cardiac marker point-of-care testing in the emergency department and cardiac care unit. *Clin Chem* 1998; 44:1865-9.
-