

Analysis of Door-to-Balloon (D2B) Time in STEMI Patients at EHCC Hospital, Jaipur

Kajal Chowdhury

MBA – Hospital and Health Management

IIHMR University, Jaipur

Introduction

- ▶ STEMI is a severe cardiac emergency needing urgent care.
- Delay in treatment increases heart muscle damage and risk of death.
- ▶ Door-to-Balloon (D2B) time measures how quickly patients receive PCI after arriving at ER.
- It is a globally recognized performance indicator.
- ▶ This study evaluates EHCC Hospital's D2B performance over three months.
- Goal is to identify trends, causes of delay, and recommend improvements.

Objectives of the Study

- ▶ To calculate D2B time at EHCC Hospital.
 - Understand actual performance across March, April, and May.
- ▶ To identify delays and patterns in emergency cardiac care.
 - Analyze where and when most delays occur in the patient pathway.
- ▶ To benchmark against national and international standards.
 - Compare results with the recommended ≤ 90 -minute D2B time.
- ▶ To provide improvement recommendations.
 - Suggest practical interventions based on real-world data.

Methodology

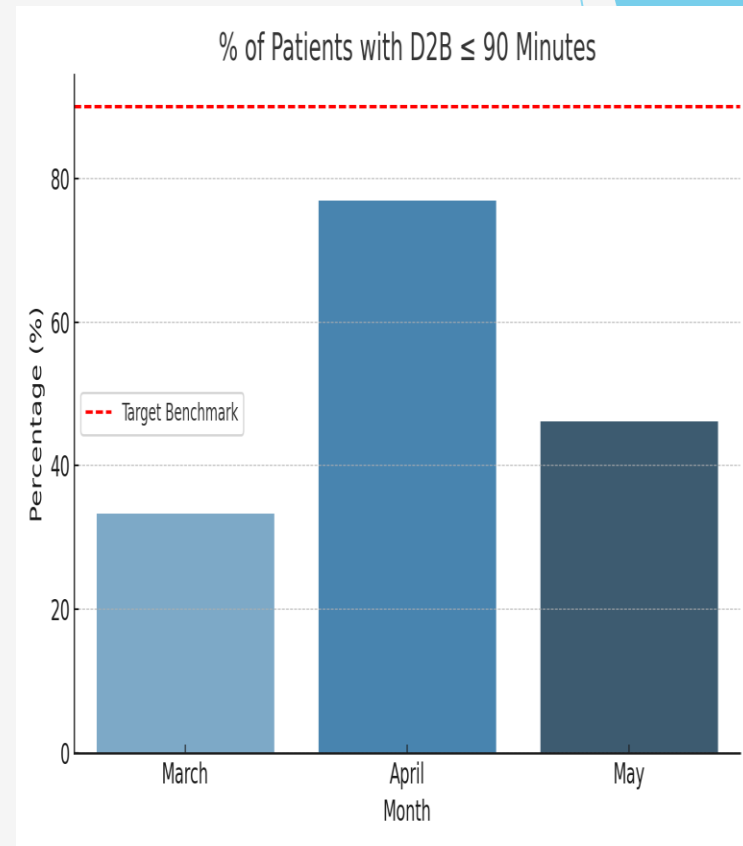
- ▶ Study Design: Retrospective observational study.
 - Based on historical data from STEMI patients.
- ▶ Sample Size: 35 patients who underwent primary PCI.
 - Data collected from March to May 2025 at EHCC Hospital.
- ▶ Tool: Timestamped hospital dataset for each patient.
 - Includes times for ECG, preparation, shifting, and balloon inflation.
- ▶ Analysis: Used descriptive statistics and benchmarks.
 - Focused on identifying delays and monthly performance.

Key Findings

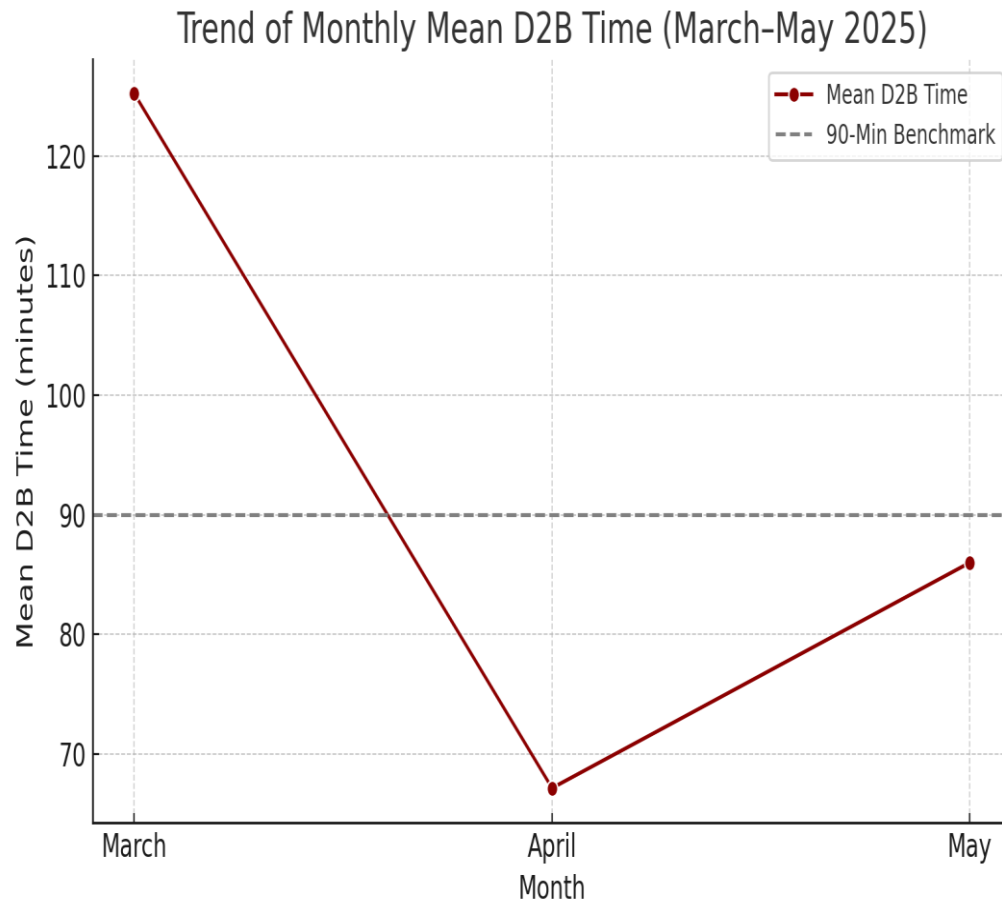
- ▶ The overall mean D2B time was 89.09 minutes, narrowly meeting the ≤ 90 -minute benchmark.
 - Indicates that EHCC generally adheres to international standards but with variability.
- ▶ March recorded the highest delays with a mean of 125.22 minutes.
 - Only 33.3% of patients were treated within the recommended time.
- ▶ April showed substantial improvement, dropping the mean to 67.15 minutes.
 - 76.9% of cases met the benchmark, linked to enhanced protocol implementation.
- ▶ May's average rose to 86.00 minutes, indicating partial regression.
 - Compliance dropped to 46.2%, showing the need for sustained interventions.
- ▶ The Door to ECG time was efficient across all months (~2.5–6.4 minutes).
 - Confirms ER triage efficiency; the delay lies in preparation and transfer phases.

D2B Time Summary (March–May 2025)

- ▶ March: 125.22 mins (33.3% ≤ 90 min)
- ▶ April: 67.15 mins (76.9% ≤ 90 min)
- ▶ May: 86.00 mins (46.2% ≤ 90 min)
- ▶ Improvement in April shows value of coordination and SOPs.



Trend of Monthly Mean D2B Time



▶ March

High Delay Longest average D2B time: 125.22 minutes. Indicates major inefficiencies in preparation or shifting. Poor compliance with international benchmark (≤ 90 mins).

▶ April

Significant Improvement D2B time reduced to 67.15 minutes. Highest compliance: ~77% of patients treated on time. Likely due to better coordination, protocol implementation, and team readiness.

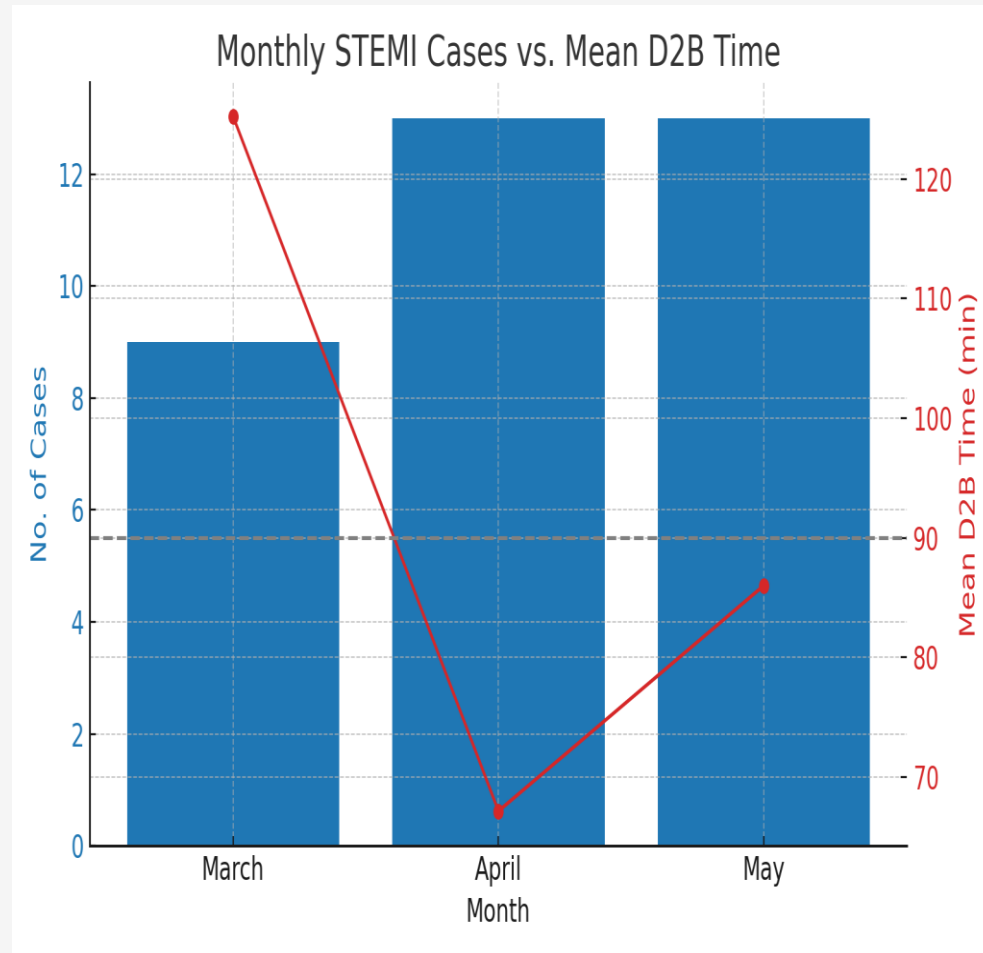
▶ May

Partial Decline D2B time increased slightly to 86.00 minutes. Still within benchmark, but compliance dropped to 46.2%. Indicates lack of follow-up or sustained intervention

Interval-wise Delay Analysis

- ▶ Interval-wise comparison across the months reveals:
 - ▶ Door to ECG Time:
 - March: 2.78 mins | April: 2.62 mins | May: 6.38 mins
 - Consistently fast, indicating effective initial ER response.
 - ▶ Preparation Time:
 - March: 11 mins | April: 13 mins | May: 18 mins
 - Consistently fast, indicating effective patient preparing.
 - ▶ Shifting Time:
 - Data unavailable or inconsistent in source file.
 - March had shifting delays noted in early findings (avg 61.89 mins), impacting overall D2B time.
- ▶ Conclusion: Greatest delays stem from patient preparation and transfer, not ER or diagnosis.
Getting the patient consent plays a major role for delay.

Monthly STEMI Cases vs. Mean D2B Time



- ▶ April handled more patients with better time, disproving the assumption that higher volume delays care.
- ▶ March had fewer patients but worst delays, indicating systemic inefficiencies, not workload stress.

Discussion

- ▶ March's poor performance despite low patient volume indicates systemic delays.
- ▶ Suggests that workload was not the primary issue.
- ▶ April saw the best outcomes with protocol-based care.
- ▶ Demonstrates that training and coordination improve speed.
- ▶ May's fallback shows lack of sustained implementation.
- ▶ Highlights need for ongoing monitoring and reinforcement.
- ▶ D2B outcomes depend more on processes than patient load.
- ▶ Systems thinking is crucial in emergency cardiac care.

Recommendations

- ▶ Implement STEMI protocols with checklists for all staff.
- ▶ Clear roles and steps help prevent confusion during emergencies.
- ▶ Digitize timestamp logging across ER and Cath Lab.
- ▶ Enables accurate performance tracking and data audits.
- ▶ Conduct mock drills and continuous training.
- ▶ Builds reflexive response under pressure.
- ▶ Use dashboards for monthly audits and feedback.
- ▶ Drives accountability and quality improvement.

Conclusion

- ▶ Timely intervention is critical in saving STEMI patients.
- ▶ Every minute of delay leads to worse outcomes.
- ▶ April showed that protocol-led teamwork improves performance.
- ▶ Emphasizes potential for sustained improvement.
- ▶ Long-term success depends on continuous training and monitoring.
- ▶ Institutional culture of excellence is required.
- ▶ EHCC can become a cardiac care leader with these improvements.
- ▶ Requires commitment at all levels of operation.