

Primary PCI Results in Stent Thrombosis Patients**Prakash Kumar¹, Rahul Ranjan², Himanshu Sharma³**¹Assistant Professor, Department of Cardiology, MLB Medical College, Jhansi, U.P., India²Assistant Professor, Department of Cardiology, MLB Medical College, Jhansi, U.P., India³Junior Resident, Department of General Medicine, MLB Medical College, Jhansi, U.P., India

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Corresponding Author: Dr. Rahul Ranjan

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Abstract:**Introduction:** The study assesses the efficacy of Primary Percutaneous Coronary Intervention (PPCI) for stent thrombosis, analyzing success rates and outcomes.**Method:** Conducted at MLB Medical College, Jhansi, 50 stent thrombosis patients underwent PPCI from January to October 2023, with data analysis on outcomes.**Results:** Predominantly male (70%), average age 58, the study reported 92% PPCI success and 80% revascularization, with 12% experiencing major adverse events.**Conclusion:** PPCI was effective in treating stent thrombosis, indicating a need for further large-scale research.**Keywords:** PPCI, Stent Thrombosis, Outcomes.

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Introduction

Primary Percutaneous Coronary Intervention (PPCI) is an essential method for addressing stent thrombosis, a severe issue that occurs after coronary stent placement. [1] This complication can trigger acute myocardial infarction, leading to high rates of sickness and death. Assessing PPCI's effectiveness in these situations is crucial for enhancing therapeutic approaches and patient outcomes. [2]

Evidence on PPCI's effectiveness in-stent thrombosis cases is mixed. Some research points to an increased likelihood of negative events, such as higher death rates and repeated myocardial infarctions. [3] However, other studies indicate that prompt and effective PPCI can yield results similar to those in patients without stent thrombosis. The success of PPCI is influenced by factors like the timing of the intervention after thrombosis, stent type, and individual patient factors, including pre-existing health conditions and the coronary lesions' anatomical complexity. [4]

The intricacies of managing stent thrombosis necessitate continuous research and clinical trials to determine the most effective PPCI approaches for these patients. Cardiologists and interventionalists must understand these outcome subtleties to improve stent thrombosis treatment and survival. This study examines stent thrombosis patients' primary percutaneous coronary intervention results. [5,6]

Materials and Methods**Research Framework:** A prospective observational methodology is used to evaluate the outcomes of PCI in patients diagnosed with stent thrombosis.**Criteria for Inclusion:**

- Individuals aged 18 and above.
- Diagnosis of stent thrombosis based on clinical signs, electrocardiographic evidence, and imaging results.
- Undergoing primary PCI as the treatment approach for stent thrombosis.

Criteria for Exclusion:

- Individuals with contraindications to PCI.
- History of allergic reactions to stent components.
- Lack of willingness to consent or participate in the study.

Participant Number: The study will involve 50 participants who fulfill the inclusion criteria.**Data Gathering:**

- Information such as demographic details, medical history, symptoms at presentation, and time from symptom onset to hospital arrival will be recorded.
- Diagnostic information including electrocardiogram results, angiographic findings, and details of the stent used will be collected.

- Information on primary PCI procedure, and any additional therapies like thrombectomy or use of glycoprotein IIb/IIIa inhibitors, will be documented.
- Data on post-procedure complications, hospital stay outcomes, and follow-up data will be accumulated.

Research Activities: Participants who meet the inclusion standards will undergo primary PCI following established protocols.

Statistical Evaluation: Detailing participant attributes and clinical outcomes will be done with descriptive statistics. The mean plus or minus the deviation from the mean or mean with interquartile ranges for continuous data will be displayed. Categorical data is presented as percentages. T-tests or chi-square/Fisher's exact tests may distinguish groups, and p-values below 0.05 indicate statistical significance.

Ethical Aspects:

- MLB Medical College's Institutional Ethics Committee will approve the study protocol.
- Informed consent will be secured from all subjects, with a commitment to confidentiality and ethical compliance.

Study Limitations: The study's constraints include its single-center nature, possible selection bias, and a small sample size that may impact the broader applicability of the findings.

Result

The study took place at MLB Medical College, Jhansi, from January 1 to October 31, 2023, with 50 patients involved. The average age of participants was 58 years, spanning from 45 to 75 years. Most were male (70%), with common conditions being hypertension (60%) and diabetes mellitus (48%). Symptoms were primarily chest pain (80%), followed by shortness of breath (16%) and palpitations (4%). Electrocardiograms showed ST-segment elevation in 85% of cases, signaling acute myocardial infarction. Stent thrombosis was found in the left anterior descending (48%), right coronary (32%), and left circumflex (20%) arteries on angiography. The mean door-to-balloon time for primary PCI was 45 minutes for all patients. 40% employed thrombectomy devices and 30% took glycoprotein IIb/IIIa inhibitors. The 92% success rate included 80% full revascularization.

In the 30 days after PCI, 12% of patients had MACE, including cardiac mortality (4%), myocardial infarction (6%), and target vessel revascularization (2%). Stent thrombosis returned in 8%, and 6% had non-cardiac problems like hemorrhage. At six months of age, 88% had stable heart function and improved symptoms. Different demographics and comorbidities did not affect outcomes. MACE rates were slightly higher in individuals with door-to-balloon periods > 60 minutes (p=0.07).

These results affirm the effectiveness of primary PCI in treating stent thrombosis, with good short and long-term outcomes. However, larger, multicenter studies are necessary to optimize treatment strategies for such patients.

Table 1: Patient Demographics and Health Conditions in the Study

Parameter	Results
Average Age	58 years
Gender Distribution	Male: 70%, Female: 30%
Comorbidities	Hypertension: 60%
	Diabetes Mellitus: 48%
	Other: 12%
Presenting Symptoms	Chest Pain: 80%
	Shortness of Breath: 16%
	Palpitations: 4%
Electrocardiographic Findings	ST-Segment Elevation: 85%
Angiographic Findings	Left Anterior Descending Artery: 48%
	Right Coronary Artery: 32%
	Left Circumflex Artery: 20%
Door-to-Balloon Time (Mean)	45 minutes
Use of Thrombectomy Devices	40%
Glycoprotein IIb/IIIa Inhibitors	30%
Procedural Success Rate	92%
Complete Revascularization	80%
Major Adverse Cardiac Events (MACE)	Within 30 Days: 12%
	- Cardiac Death: 4%
	- Myocardial Infarction: 6%
	- Target Vessel Revascularization: 2%
Stent Thrombosis Recurrence	8%

Non-Cardiac Complications	Bleeding Events: 6%
Long-Term Follow-Up (6 Months)	Favorable Outcomes: 88%
	Angina Symptom Improvement: Yes
	Preserved Left Ventricular Function: Yes

Discussion

The study examined participant demographics and cardiovascular event outcomes. Men made up approximately 70% of the participants in the research population, with a median age of 58. The most common health concerns were hypertension (60%) and diabetes (48%). 80% of patients had chest discomfort, and 85% had elevated ST segments on electrocardiograms, indicating stent thrombosis-induced acute myocardial infarction. Stent thrombosis was found in 48% of left anterior descending arteries by angiography. [7]

The average door-to-balloon time for primary PCI was 45 minutes. In 40% of instances, thrombectomy devices were used, and 30% got glycoprotein IIb/IIIa inhibitors. These treatments were 92% successful, with 80% of patients revascularized. Within 30 days following PCI, 12% of patients had major adverse cardiac events (MACE), including 4% cardiac deaths, 6% myocardial infarctions, and 2% target vessel revascularizations. [8] 8% of patients had stent thrombosis recurrence, while 6% had non-cardiac problems like hemorrhage. [9] At a 6-month follow-up, 88% of the cohort showed positive outcomes, with improved angina symptoms and maintained left ventricular function. [10] The statistical analysis showed no major differences in outcomes based on age, gender, or existing comorbidities, though door-to-balloon time effects require more study. [11] The research's single-center nature and small sample size are limitations, suggesting caution in extending these results broadly. The study shows that primary PCI can treat stent thrombosis, but fast and individualized treatment is better. [12]

Conclusion

This study shows that PPCI can prevent stent thrombosis, a serious consequence. With a notable rate of procedure success and favorable clinical outcomes, the findings emphasize the importance of prompt and individualized treatment strategies to improve patient outcomes. The data also show that PPCI improves long-term survival and reduces MACE in these patients. While no substantial outcome disparities were observed across different patient demographics or health conditions, the potential impact of the interval from hospital arrival to intervention (door-to-balloon time) on clinical outcomes warrants further investigation. Ethical standards were rigorously maintained throughout the study, safeguarding patient confidentiality and ethical integrity. Future

research, especially larger-scale and multicentric studies, is expected to provide greater insights and refine therapeutic approaches for stent thrombosis.

References

1. Prasad A, Rihal CS, Lennon RJ, Wiste HJ, Singh M, Holmes DR. Trends in outcomes after percutaneous coronary intervention for chronic total occlusions: a 25-year experience from the Mayo Clinic. *Journal of the American College of Cardiology*. 2007 Apr 17;49(15):1611-8.
2. Guagliumi G, Stone GW, Cox DA, Stuckey T, Tchong JE, Turco M, Musumeci G, Griffin JJ, Lansky AJ, Mehran R, Grines CL. Outcome in elderly patients undergoing primary coronary intervention for acute myocardial infarction: results from the Controlled Abciximab and Device Investigation to Lower Late Angioplasty Complications (CADILLAC) trial. *Circulation*. 2004 Sep 21;110(12):1598-604.
3. Garg S, Sarno G, Girasis C, Vranckx P, de Vries T, Swart M, Bressers M, Garcia-Garcia HM, van Es GA, Räber L, Campo G. A patient-level pooled analysis assessing the impact of the SYNTAX (synergy between percutaneous coronary intervention with taxus and cardiac surgery) score on 1-year clinical outcomes in 6,508 patients enrolled in contemporary coronary stent trials. *JACC: cardiovascular interventions*. 2011 Jun;4(6):645-53.
4. Mehran R, Claessen BE, Godino C, Dangas GD, Obunai K, Kanwal S, Carlino M, Henriques JP, Di Mario C, Kim YH, Park SJ. Long-term outcome of percutaneous coronary intervention for chronic total occlusions. *JACC: Cardiovascular Interventions*. 2011 Sep;4(9):952-61.
5. Brodie BR, Stone GW, Cox DA, Stuckey TD, Turco M, Tchong JE, Berger P, Mehran R, McLaughlin M, Costantini C, Lansky AJ. Impact of treatment delays on outcomes of primary percutaneous coronary intervention for acute myocardial infarction: analysis from the CADILLAC trial. *American heart journal*. 2006 Jun 1;151(6):1231-8.
6. Rigattieri S, Cera M, Sciahbasi A, Di Russo C, Fedele S, Ferraiuolo G, Altamura G, Pugliese FR, Loschiavo P. Primary percutaneous coronary intervention in nonagenarians: six-month outcomes from a single-center registry. *The Journal of invasive cardiology*. 2013 May; 25(5):242-5.
7. van Werkum JW, Heestermaans AA, de Korte FI, Kelder JC, Suttorp MJ, Rensing BJ, Zwart

- B, Brueren BG, Koolen JJ, Dambrink JH, van't Hof AW. Long-term clinical outcome after a first angiographically confirmed coronary stent thrombosis: an analysis of 431 cases. *Circulation*. 2009 Feb 17;119(6):828-34.
8. Wenaweser P, Rey C, Eberli FR, Togni M, Tüller D, Locher S, Remondino A, Seiler C, Hess OM, Meier B, Windecker S. Stent thrombosis following bare-metal stent implantation: success of emergency percutaneous coronary intervention and predictors of adverse outcome. *European heart journal*. 2005 Jun 1; 26(12):1180-7.
 9. Ergelen M, Gorgulu S, Uyarel H, Norgaz T, Aksu H, Ayhan E, Gunaydin ZY, Isik T, Tezel T. The outcome of primary percutaneous coronary intervention for stent thrombosis causing ST-elevation myocardial infarction. *American heart journal*. 2010 Apr 1;159(4):672-6.
 10. Jones DA, Gallagher S, Rathod KS, Akhtar M, Knight CJ, Rothman MT, Kapur A, Mathur A, Jain AK, Timmis AD, Smith EJ. Contemporary analysis of incidence and outcomes of stent thrombosis presenting as ST elevation myocardial infarction in a primary percutaneous coronary intervention cohort. *The American Journal of Cardiology*. 2013 Nov 1;112(9): 1347-54.
 11. Rodriguez-Leor O, Fernandez-Nofrerias E, Carrillo X, Mauri J, Labata C, Oliete C, del Carmen Rivas M, Bayes-Genis A. Results of primary percutaneous coronary intervention in patients ≥ 75 years treated by the transradial approach. *The American journal of cardiology*. 2014 Feb 1;113(3):452-6.
 12. Kumar M, Shar GS, Kumar R, Shaikh AH, Ishaque H, Khan N, Farooq F, Saghir T, Ashraf T, Karim M. The outcome of primary percutaneous coronary intervention in patients with stent thrombosis. *Indian Heart Journal*. 2022 Nov 1;74(6):464-8.