

**Critical Care Department experience and  
long term follow-up of patients undergoing  
Percutaneous Coronary Intervention**

Thesis

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Investigator

*Walid Mohamed Kamel*

*MB.B.CH*

Supervisor

*Ayman El Naggar MD.*

*Assistant professor of critical care medicine,*

*Critical care department,*

*Cairo University*

*Ayman Moharem MD      Khaled Taieema MD.*

*Lecturer of critical care medicine,      Lecturer of critical care medicine,*

*Critical care department,*

*Critical care department,*

*Cairo University*

*Cairo University*

*Cairo University*

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# متابعة طويلة الأمد لمرضى القسطرة التداخلية بقسم طب الحالات الحرجة

رسالة مقدمة من

الطبيب/ وليد محمد كامل أحمد

توطئة للحصول على درجة الماجستير

فى طب الحالات الحرجة

تحت إشراف

أ.د. أيمن إبراهيم النجار

أستاذ م. طب الحالات الحرجة

قسم طب الحالات الحرجة

كلية الطب – جامعة القاهرة

د. خالد محمد طعيمة

مدرس طب الحالات الحرجة

قسم طب الحالات الحرجة

كلية الطب-جامعة القاهرة

د. أيمن نهاد محرم

مدرس طب الحالات الحرجة

قسم طب الحالات الحرجة

كلية الطب-جامعة القاهرة

جامعة القاهرة

٢٠١٠

*E*gyptian- *C*ritical care *D*epartment  
*A*ngioplasty *R*egistry

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*Walid Kamel*

# **Critical Care Department experience and long term follow-up of patients undergoing Percutaneous Coronary Intervention**

## **Abstract**

**Objective:** We aimed at registering our elective PCI procedures, with respect to their procedure details, outcome, in-hospital complications and long term follow-up. We tried to determine our performance in comparison to other registries and to find out risk factors associated with poor outcomes during the period from January 2003 to December 2007.

**Design, setting and participants:** Retrospective analysis of data, retrieved through reviewing written paper and electronic database. The material of the study included 1897 patients (1567 male and 333 females) who proceeded to PCI at the Critical Care department, Cairo University ( between January 2003 to December 2007), with follow-up 1-5 years.

**Main outcome measures:** Clinical events including death, myocardial infarction (MI), need for revascularization and major adverse cardiac events (MACE) (a composite of death, MI and need for revascularization), during the in-hospital stay and every 12 months of follow-up till the end of 2008.

**Results:** The cohort was predominantly male (82.2%), with a mean age of 55 years (SD, 9 years). We had a wide variety of PCI procedures outcome in our registry. BMS stenting shared up to 75.1% of our patients,

while DES shared up to 9.8% and PTCA shared up to 4.1%. Failed PCI contributed to 4.4% of total patients' interventions. There were 1425 patients (75.1%) who received 1813 BMS and 186 patients (9.8%) who received 210 DES

In the overall cohort, rates of clinical events were low during the hospital stay: mortality (0.3%), MI (0.5%) with no reported cases of urgent revascularization. Angiographic complications, irrelevant to post-PCI TIMI flow pattern, occurred in 6.8% of cases in our registry. Clinical success was achieved in 92.8% of cases. Year 2003 had complication rate of 16.8% and it declined till it reached 4.5% in 2006 & 7.4% in 2007.

At 12 months, event rates were: death rate was 3.2% at first year, 5.4% at second year, 7.4% at third year, and 9.9% at fourth year and increased up to 24.2% at 5 years follow-up durations. Myocardial infarction rate was 2.1% at first year, 4.2% at second year, 6.8% at third year, and 8.6% at fourth year and increased up to 17.2% at 5 years follow-up durations. Need for revascularization rate was 8.5% at first year, 10.8% at second year, 12.4% at third year, and 14.7% at fourth year and increased up to 35.9% at 5 years follow-up durations. MACE rate was 10.2% at first year, 15.5% at second year, 19.8% at third year, and 25.2% at fourth year and increased up to 62.5% at 5 years follow-up durations. Through reviewing our patients' database, we could affirm a significant relationship between renal impairment and occurrence of PCI procedure complications. Also Chronic Total occlusion (CTO), long lesions i.e. >20mm, bifurcational lesions, predilatation versus direct stenting, post-dilatation, & number of stents implanted in the same setting were significantly related to poor outcomes in our patients.

Our study concluded that there was no difference between BMS and DES, regarding death, MI events & MACE rates. DES outperformed BMS in need for revascularization which was consistent with results of many results published worldwide.

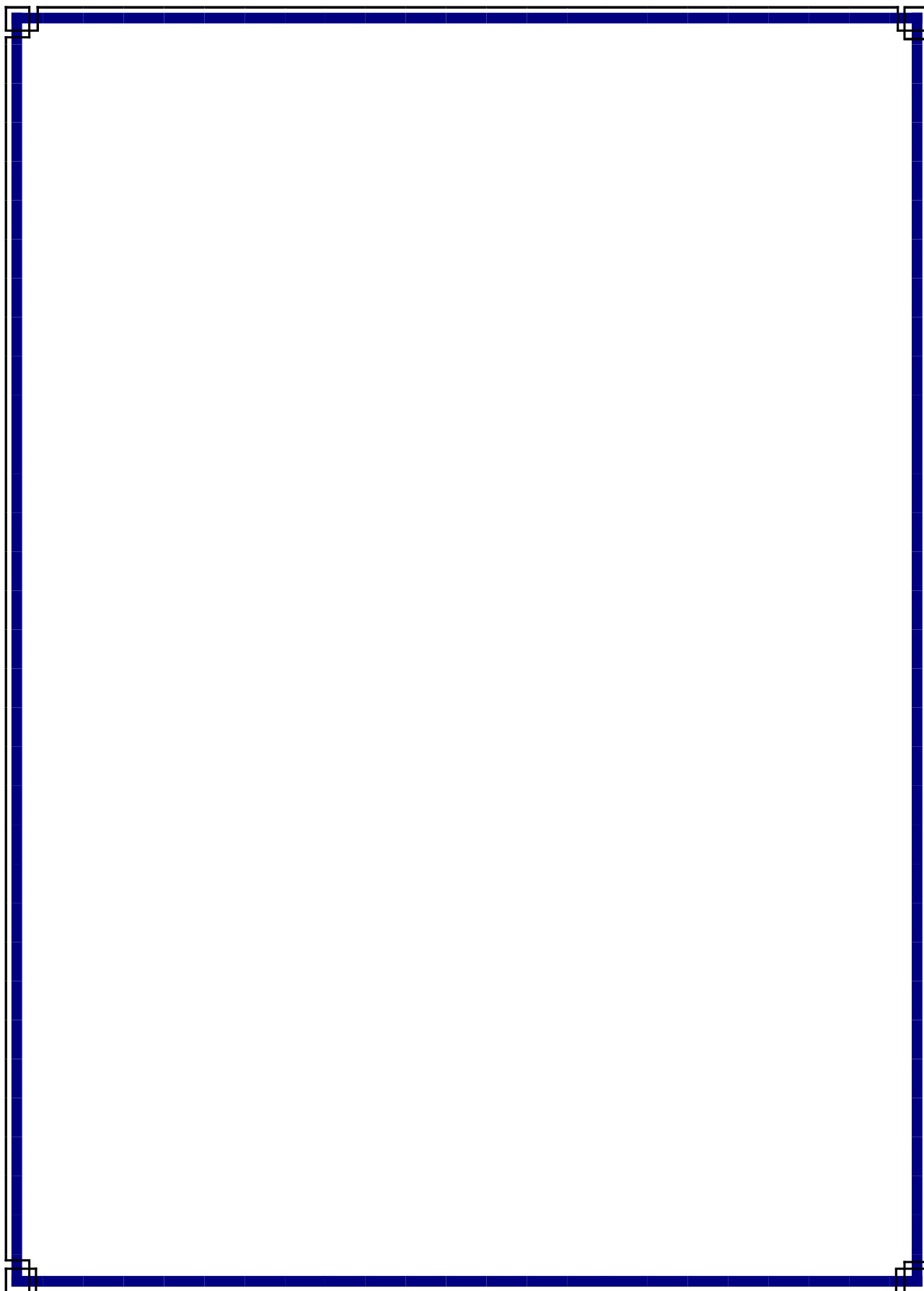
**Conclusion:** Our clinical event rates were comparable with other international registries outcomes. Through reviewing and comparing our data, we concluded that our experience is comparable to other registries. We differed in our demographic features which affected our patients' characteristics. This confirmed our need to establish our own registries, based on our real-life scenarios in developing countries where patients' demographics differ significantly, despite close results which might not be true on larger scale studies.

**Keywords:** PCI registry, PTCA, BMS, DES, MACE, failed PCI



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# ***List Of Abbreviations***

|            |                                                                                  |
|------------|----------------------------------------------------------------------------------|
| ACC:       | American College of Cardiology                                                   |
| ACC–NCDR:  | The American College of Cardiology- National Cardiovascular Data Registry        |
| ACIP :     | Asymptomatic cardiac ischaemia pilot study                                       |
| ACS :      | Acute coronary syndrome                                                          |
| ACT :      | Activated clotting time                                                          |
| ADVANCE:   | Additional Value of NIR Stents for Treatment of Long Coronary Lesions            |
| APPROACH:  | Alberta Provincial Project for Outcomes Assessment in Coronary Heart Disease     |
| ARC :      | The Academic Research Consortium                                                 |
| ARMYDA-2:  | Antiplatelet Therapy for Reduction of Myocardial Damage During Angioplasty Study |
| ARTS:      | Arterial revascularization therapies study                                       |
| AVERT:     | Atorvastatin Versus Revascularization Treatment study                            |
| AWESOME:   | Angina With Extremely Serious Operative Mortality Evaluation                     |
| BENESTENT: | Belgium Netherlands Stent study                                                  |
| BMS:       | Bare metal stent                                                                 |
| CABG:      | Coronary artery bypass grafting                                                  |

|               |                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------|
| CAD :         | Coronary artery disease                                                                                               |
| CASS:         | Coronary artery surgery study                                                                                         |
| COMMIT/CCS-2: | Clopidogrel and Metoprolol in Myocardial Infarction Trial/Second Chinese Cardiac Study -- The Metoprolol Arm-2 trial  |
| COURAGE :     | Clinical Outcomes Utilization Revascularization and Aggressive Drug Evaluation                                        |
| CREDO:        | Clopidogrel for reduction of events during observation                                                                |
| CRT :         | Crush stent technique                                                                                                 |
| CTO:          | Chronic total occlusions                                                                                              |
| CVS:          | Cerebrovascular stroke                                                                                                |
| D:            | Diagonal branch                                                                                                       |
| DCA :         | Directional Coronary Atherectomy                                                                                      |
| DES:          | Drug eluting stent                                                                                                    |
| ECDAR:        | Egyptian Critical care Department Angioplasty registry                                                                |
| EES:          | Everolimus eluting stent                                                                                              |
| ELCA:         | The excimer laser catheter                                                                                            |
| EPISTENT:     | Evaluation of Platelet IIb/IIIa Inhibitor for Stenting                                                                |
| ERACI-2:      | Argentine Randomized Study: Coronary Angioplasty with Stenting Versus Coronary Bypass Surgery in Multi-Vessel Disease |

|                 |                                                                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| ESC:            | European Society of Cardiology                                                                                                             |
| FDA:            | Food and Drug Administration                                                                                                               |
| FREEDOM:        | Future Revascularization Evaluation in patients with. Diabetes mellitus optimal management of Multivessel disease                          |
| FRISC-2:        | Fast Revascularization during Instability in Coronary Artery Disease study                                                                 |
| GP :            | glycoprotein                                                                                                                               |
| ICTUS:          | Invasive versus Conservative Treatment in Unstable Coronary Syndromes study                                                                |
| ISAR-DIABETES : | Paclitaxel-Eluting Stent Versus Sirolimus-Eluting Stent for the Prevention of Restenosis in Diabetic Patients With Coronary Artery Disease |
| ISAR-REACT:     | Intracoronary Stenting and Antithrombotic Regimen: Rapid Early Action for Coronary Treatment trial                                         |
| ISR:            | Instent restenosis                                                                                                                         |
| IVUS :          | Intra-vascular ultrasound                                                                                                                  |
| KST:            | Kissing stent technique                                                                                                                    |
| LAD :           | Left anterior descending artery                                                                                                            |
| LCx :           | Left circumflex                                                                                                                            |
| LM :            | Left main                                                                                                                                  |
| LMWH:           | Low molecular weight heparin                                                                                                               |

|                  |                                                                                                                                     |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| LVEF:            | Left ventricular ejection fraction                                                                                                  |
| MACE:            | Major Adverse Cardiovascular Event                                                                                                  |
| MASS-2:          | The medicine, angioplasty, or surgery study-II study                                                                                |
| MI:              | Myocardial infarction                                                                                                               |
| MIG :            | Melbourne Interventional Group                                                                                                      |
| MOH :            | Ministry of health                                                                                                                  |
| MVD :            | Multivessel disease                                                                                                                 |
| NCVD:            | National Cardiovascular Disease Database                                                                                            |
| NHLBI:           | National heart, lung and blood institute                                                                                            |
| Need for Revasc: | Need for Revascularization                                                                                                          |
| NR_Th:           | National registry of Thailand                                                                                                       |
| NSTEMI:          | Non- ST segment elevation MI                                                                                                        |
| OM :             | Obtuse marginal                                                                                                                     |
| PCI:             | Percutaneous coronary intervention                                                                                                  |
| PCI-CURE:        | Clopidogrel in unstable angina to prevent recurrent ischemic events in patients undergoing percutaneous coronary intervention trial |
| PDA :            | Posterior descending artery                                                                                                         |
| PES :            | Paclitaxel eluting stent                                                                                                            |
| PL :             | Postero-lateral branch                                                                                                              |
| PTCA:            | Percutaneous transluminal coronary angioplasty                                                                                      |

|                  |                                                                                                                                                   |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| PTFE :           | polytetrafluoroethylene                                                                                                                           |
| RA :             | Rotational atherectomy                                                                                                                            |
| RAVEL:           | Randomized study with the sirolimus-eluting Bx Velocity balloon-expandable stent                                                                  |
| RCA :            | Right coronary artery                                                                                                                             |
| RITA-3:          | Randomized Intervention Trial of Unstable Angina-3 trial                                                                                          |
| RVD :            | Reference vessel diameter                                                                                                                         |
| SCAAR:           | Swedish Coronary Angiography and Angioplasty Registry                                                                                             |
| SES:             | Sirolimus eluting stent                                                                                                                           |
| SES-SMART:       | Sirolimus-Eluting Stent in the Prevention of Restenosis in Small Coronary Arteries                                                                |
| SIRTAX:          | Randomized Comparison of a Sirolimus- vs a Paclitaxel-Eluting Stent for Coronary Revascularization                                                |
| SoS :            | Stent or surgery study                                                                                                                            |
| STEMI:           | ST segment elevation MI                                                                                                                           |
| STRESS:          | The North American Stem Restenosis study                                                                                                          |
| SVG :            | Saphenous vein graft                                                                                                                              |
| SYNTAX :         | Synergy between PCI with taxus and cardiac surgery                                                                                                |
| TACTICS-TIMI 18: | Treat Angina with aggrastat and determine Cost of Therapy with Invasive or Conservative Strategy – Thrombolysis In Myocardial Infarction-18 study |

|                  |                                                                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| TIMI :           | Thrombolysis In Myocardial Infarction                                                                                                               |
| TIMI 28-CLARITY: | Clopidogrel as Adjunctive Reperfusion Therapy --<br>Thrombolysis in Myocardial Infarction 28                                                        |
| TLR:             | Target lesion revascularization                                                                                                                     |
| Tn :             | Troponin                                                                                                                                            |
| TRITON-TIMI 38 : | Trial to assess Improvement in Therapeutic Outcomes by<br>optimizing platelet Inhibition with prasugrel Thrombolysis In<br>Myocardial Infarction 38 |
| TTP :            | Thrombotic thrombocytopenic purpura                                                                                                                 |
| TULIP:           | Final Results of a Randomized Comparison With Angiographic<br>Guidance                                                                              |
| TVR :            | Target Vessel Revascularization rate                                                                                                                |
| UA :             | Unstable angina                                                                                                                                     |
| UFH :            | Unfractionated heparin                                                                                                                              |
| VLST:            | Very late stent thrombosis                                                                                                                          |
| WDRH:            | Western Denmark heart registry                                                                                                                      |
| ZES :            | Zotarolimus eluting stent                                                                                                                           |