

# الآيـة

قال تعالى " **فَالْعَالِي**

**قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلِمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ**

صدق الله العظيم

سورة البقرة الآية (32)

## **Dedication**

To my parents my brothers and sisters and to all my teachers  
Who taught me in all my additional stages, especially to Medical  
Laboratories teachers in Sudan University  
Who developed and progress the medical laboratories in Sudan  
To all people who always hope to Sudan to be developed

### ***Acknowledgment***

I thank everybody who contributed the success of This work and

My thanks and gratitude to my supervisor :-

**Dr. Sana Eltahir**

I am very grateful for my family for their encouragement and support  
during the difficult Time of research..and who help me in data analysis

**Sadeg Ahmed**

Special thanks to the workers in laboratories of Sudan cardiac center ..

## Abstract

This is hospital based cross sectional analytical study in Sudan cardiac center (Khartoum State) during the period March to July 2011 .In Open heart Surgery Patients to evaluate routine coagulation profile and platelets count. Open heart surgery patients were selected for this study 50 blood sample were collected before surgery and 50 sample were collected after surgery to evaluate coagulation profile by manual methods and platelets count by sysmex automated method. The gender distribution showed that male 33 (66%) and female 17 (34%) were Prothrombin time pre surgery was 15.37 seconds, and post surgery was 21.84 seconds with significant difference ( P. value .000 ) . Activated partial thromboplastin time pre surgery was 35.08 seconds and post surgery was 42.74 seconds with significant difference ( P. value 0.001) . Platelets count pre surgery was 231.92 , and post surgery was 216.86 with significant difference ( P. value 0.001). All the coagulation profile showed prolongation , platelets count decreased from the count pre surgery .The reduced amount of coagulation factors after surgery due to exposure of the patients blood to cardiopulmonary bypass circuitry diminishes the hypercoagulable state and proceeds into an imbalanced hypocoagulable phase as conclusion open heart surgery were effected the haemostatic mechanism in both male and female the ( PT,INR, APTT ) showed . significant prolongation and platelets count showed significant decrease

## ملخص الدراسة

هذه دراسة تحليلية مقطعة في مركز السودان للقلب ( ولاية الخرطوم ) اجريت في الفترة ما بين مارس وحتى يوليو 2011م في مرضى عمليات القلب المفتوح وذلك لتقدير التخثر وعدد الصفائح الدموية عند طريق أخذ العينات ( عينات احتمالية ) أخذت عينة الدراسة 50 قبل و50 بعد جراحة القلب المفتوح ، وقد استخدمت الطريقة اليدوية لتقدير التخثر وعدد الصفائح الدموية عن طريق جهاز العد الآلي. كان توزيع المرضى من الجنسين 33 من الذكور ( 66% ) و 17 من الإناث بلغت نسبتهم ( 34% ) . عند مقارنة التخثر والصفائح الدموية قبل العملية وبعد العملية وجد أن PT قبل الجراحة بقيمة 15.73 ثانية اما بعد العملية 21.84 ثانية مع اختلاف ذو دلالة احصائيه ( P. value= 0.000 ) وأن APTT ذو قيمة قبل الجراحة 35.08 ثانية وبعد الجراحة 42.74 ( ثانية ) مع اختلاف ذو دلالة احصائيه P. value = 0.001 ) وأن عدد الصفائح الدموية قبل الجراحة بقيمة ( 231.92 \cmm )، وبعد الجراحة بقيمة ( 216.86 \cmm ) ، مع اختلاف ذو دلالة احصائيه ( P. value 0.001 ) أظهرت النتائج أن هناك زيادة في زمن التخثر وانخفاض في عدد الصفائح الدموية . وقد ثبت أن انخفاض كمية عوامل التخثر وانخفاض في عدد الصفائح الدموية . وقد ثبت أن انخفاض كمية عوامل التخثر بعد الجراحة بسبب تعرض دم المريض لجهاز ضخ الدم الآلي مما يؤدي إلى زيادة زمن التخثر ( PT, APTT, INR ) لمرضى عمليات القلب المفتوح وأيضاً نقص عدد الصفائح الدموية في كل من الذكور والإناث .

## Table of contents

## Chapter One

## Introduction and literature review

1	1.1 Introduction	1
2	1.2. Literature review	2
3	Hemostasis 1.2.1	2
4	1.2.2 Classification of haemostasis	2
5	1.2.2.1 Primary haemostasis	2
6	1.2.2.2 Secondary hemostasis	3
7	1.2.2.2.1 Extrinsic Pathway	5

8	1.2.2.2.2 Intrinsic Pathway	7
9	1.2.2.2.3 Common pathway	9
10	1.2.3 Natural Inhibitors	10
11	1.2.4 Fibrinolysis	11
12	1.2.5 Platelets	12
13	1.2.6 platelets activation	13
14	1.2.7 Granule secretion	14
15	1.2.8 Thromboxane A2 synthesis	14
16	1.2.13 Adhesion and aggregation	14
17	1.2.10 The Heart	15
18	1.2.10.1 Anatomy of the heart	16
19	1.2.10.2 Function of the heart	19
20	1.2.10.3 Cardiac Cycle	19
21	1.2.10.4 Control of the Heart Rate	20
22	1.2.10.5 Cardiac Output	21
23	1.2.11 Diseases of the heart	22
24	1.2.12 Cardiac Surgery	31
25	1.2.12.1 Open heart surgery	31
26	1.2.12.2 Types of Open Heart Surgery	32
27	1.2.12.2.1 Coronary artery bypass graft (CABG)	32
28	1.2.12.2.2 Heart valve procedures.	33
29	1.2.12.2.3 Valve Repair Surgical	33
30	1.2.12.2.4 <u>Heart transplant</u>	34
31	1.2.12.2.5 Thoracic aortic aorta procedures	34
32	1.2.13 Study In Sudan	35

33	1.2.14 Rationale	36
34	1.2.115 Objectives	37
<b>Chapter Two</b>		
<b>Materials and Methods</b>		
35	2.1 Study design	38
36	2.2 Study area	38
37	2.3 Exclusion criteria	38
38	2.4 Inclusion criteria	38
39	2.5 Sample size	38
40	2.6 Tool of data collection	38
41	2.7 Data analysis	39
42	2.8 Sampling	39
43	2.9 Ethical clearance	39
44	2.10 Method of collection	39
45	2.10.1 Platelet count	40
46	2.10.2 Prothrombin time:	41
47	2.10.3 Activated partial thromboplastin time:	41
<b>Chapter three</b>		
<b>Results</b>		
48	3. Results	43
<b>Chapter Four</b>		
<b>Discussion, Conclusion and Recommendation</b>		
49	Discussion	48

50	Conclusion	50
51	Recommendation	51
52	<b>References</b>	52
53	<b>Appendixes</b>	54

## **List of Tables**

No	Title	Page
3.2	Gender distribution	46
3.3	Coagulation International Factors Normalized ratio	48
3.4	Platelets count	50

### List of Figures

No	Title	Page
1.1	Primary haemostasis	

1.2(C)	Secondary heamostasis	11
1.3(D)	Antithrombotic counter-regulation	11
1.4	Scanning electron micrograph of blood cells(platelets activation)	16
1.5	Heart structure	21
1.6	Pulmonary artery	29
3.7	Comparison between PT pre surgery and post surgery	47
3.8	Comparison between APTT pre surgery and post surgery	49

## Abbreviations

1	ADP	Adenosine diphosphate
2	APTT	Activated partial thromboplastin time
3	ATP	Adenosine triphosphate
4	CABG	Coronary artery by pass graft
6	CDC	Center of disease control
7	COX	Cyclooxygenase
8	CPB	Cardiopulmonary bypass
9	DIC	Disseminated intravascular coagulation
10	DNA	Deoxyribonucleic acid
11	ECG	Electrocardiography
12	FDP	Fibrinogen degradation products
13	GP	Glycoprotein
14	HMWK	High molecular weight kininogen
15	ICU	Intensive care unit
16	INR	International normalized ratio
17	ISI	International sensitive index
18	LCD	Liquid crystal display
19	LVAD	Left ventricular assisted device
20	mm	Millimeters
21	PAI	Plasminogen activators inhibitors
22	PF3	Platelets Factor 3
23	PGD2	Prostaglandin D2
24	PGI2	Prostacyclin

25	PK	Prekallikrein
26	PT	Prothrombin time
27	SA node	Sinoatrial node
28	TPA	Tissue plasminogen activator
29	TXA2	Thromboxane A2
30	vWF	von Willebrand Factor