PARTIAL THROMBOPLASTIN TIME AND PROTHROMBIN TIME AS INDICATORS OF HEMORRHAGIC RISK IN POSTOPERATIVE PATIENTS ON WARFARIN PROPHYLAXIS

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ABSTRACT

Background: The partial thromboplastin time (PTT) or activated partial thromboplastin time is a performance indicator measures the efficacy of both the "intrinsic" (now referred to as the contact activation pathway) and the common coagulation pathways. **Objective:** This study aimed to assess Prothrombin Time and Activated Partial Thromboplastic Time in Postoperative Patients on Warfarin Prophylaxis as a risk factor of post-operative bleeding. **Materials and Methods:** This was a case-control study conducted in Khartoum, Sudan. It included 100 participants, (50 Sudanese Patients undergoing surgery who was taken prophylaxis warfarin as a cases, compared with 50 age and sex matched normal subjects as control). Prothrombin Time, Activated Partial Thromboplastic Time and INR levels were determined by Stago ® coagulometer. **Results:** Mean age of participants was 62 years, the majority 62% of them were females. Mean levels of APTT and PT among cases was (66 ± 25) and (33 ± 5) respectively, compared with (41 ± 6) and (13 ± 3) respectively, among controls. Both findings of APTT and PT differences revealed significant association between groups, ($P=.000$). postoperative bleeding was obtained in 17 (34%) of cases, and 4 (8%) of controls. Significant association revealed between groups; ($P=.000$). **Conclusion:** This study concluded that; PT and APTT were prolonged in Postoperative Patients on warfarin prophylaxis. So, PT and APTT levels were strongly affected by warfarin prophylaxis.

KEYWORDS: PT, PTT, Warfarin Prophylaxis.

INTRODUCTION

Partial thromboplastin time (PTT) or activated partial thromboplastin time (PTT or APTT) is a performance indicator measuring the efficacy of both the "intrinsic" (now referred to as the contact activation pathway) and the common coagulation pathways. Apart from detecting abnormalities in blood clotting.[1] Hemorrhaging or bleeding is the loss of blood escaping from the circulatory system.[2] Bleeding can occur internally, where blood leaks from blood vessels inside the body, or externally, either through a natural opening such as the mouth, nose, ear, urethra, vagina or anus, or through a break in the skin.[3]

Warfarin (also known by the brand names Coumadin, Jantoven, Marevan, Uniwarfin) is an anticoagulant normally used in the prevention of thrombosis and thromboembolism, the formation of blood clots in the blood vessels and their migration elsewhere in the body respectively.[4] Warfarin is commonly but incorrectly referred to as a blood thinner. It was initially introduced in 1948 as a pesticide against rats and mice and is still used for this purpose, although more potent poisons such as brodifacoum have since been developed. In the early 1950s, warfarin was found to be effective and relatively safe for preventing

thrombosis and thromboembolism in many disorders.[5] It was approved for use as a medication in 1954 and has remained popular ever since; warfarin is the most widely prescribed oral anticoagulant drug in North America.[6] INR stands for international normalized ratio. The INR provides some information about a person's blood's tendency to clot (which is often described as how "thin" or "thick" their blood is). The INR comes from the conversion of another value, the prothrombin time (PT). Prothrombin time is the time it takes for blood to clot in a test tube. A high or low PT can suggest bleeding or clotting tendencies. Most often, the PT is checked to monitor a person's response to blood thinners such as warfarin.[7]

MATERIALS AND METHODS

This was a case-control study carried out at Cardiac surgery and Renal Transplantation Center, and Ahmed Gasim Hospital from May to September 2017. 100 citrated blood samples were taken from participants undergoing surgery, (50 cases were on warfarin prophylaxis, and 50 age and sex matched as a healthy controls). Present study aimed to evaluate haemorrhagic risk during postoperative period.

Blood samples were collected from all subjects in Sodium citrate containers for measurement of PT and aPTT using Stago ® coagulometer. All patients were stable at time of operation. diabetes, acute infectious or chronic inflammatory disease and patients used to use any other hemolytic medications were excluded from this study. This study was approved by ethical committee of ministry of health, and informed consent was obtained from each participant before sample collection. All statistical analyses were performed by SPSS software version.[20] Continuous variables were expressed as mean and standard deviation, p-value < 0.05 was considered significant.

Coagulation profile
PT was measured by delivering 0.1 ml of patient platelet poor plasma in to containing stir in semi- automated coagulometer, 0.2 ml was added of classified thromboplastin by automatic pipette, then pressing start at that moment. The machine was recorded the measurement time at the moment which the clot was formed. APTT was measured by delivering 0.1 ml of

patient platelet poor plasma in to containing stir in semi-automated coagulometer, 0.1 ml of the Kaolin-phospholipid solution was added by automatic pipette and start the stopwatch simultaneously after 3 minutes added 0.1 ml of CaCL2 then pressing start at that moment. The machine recorded the measurement time at the moment which the clot was formed.

RESULTS
Demographic and clinical characteristics of study participants
In total of 100 subjects included in our study, 50 cases was using prophylactic Warfarin 2.5 mgs for 3 to 5 days preoperatively matched to 50 normal controls. mean age of cases was 62 years similar to controls, it was ranged from 45 years to 78 years in cases, and from 50 years to 75 years in controls. In addition, 19 (38%) were males and 31 (62%) were females in case group. And 23 (46%) were males and 27 (54%) were females in control group. Table (1 and 2).

Table (1): Show the mean age of control and case.

groups	N	Minimum	Maximum	Mean	Std. Deviation
case	50	45	78	62	9
control	50	50	75	62	7

Table (2): Show the frequency of gender among study groups.

Groups	Male		Female	
	frequency	Percent	frequency	Percent
Cases	19	38	31	62
Controls	23	46	27	54

Comparison of PT and PTT of the study participants
Table (3) represent mean level of PTT. It showed 66±25 among cases and 41±6 among controls, the differences were strongly significant between study groups when P-value= (.000).

similarly with PTT, PT was higher among cases than controls; (33±5) and (13±3) respectively. the differences between cases and controls were strongly significant when P-value=(.000).

Table (3): Shows mean level of PTT and PT and relationship.

variables	group	Mean	Std. Deviation	P-value
PTT	case	66	25	.000
	control	41	6	
PT	Case	33	5	.000
	Control	13	3	

P. value < 0.05 considered significant.

Table (4): Show postoperative bleeding among study groups.

groups	frequency	Percent	P-value
Cases	17	34	.000
Controls	4	8	

P. value < 0.05 considered significant.

Table (4) illustrate the presence of postoperative bleeding among study groups, It was occurred in 17 (34%) of cases, and 4 (8%) in controls. The differences were strongly significant, P-value = (.000).

DISCUSSION
Our study demonstrate that; mean age of cases was similar to controls 62 year, the majority of participants 62% were

females when the rest 38% were males. In addition, mean level of APTT in case group was higher 65±25 than 41±6 among controls. Similar findings were revealed with PT, mean level of PT in case group was elevated 33 than 13 in controls. there was very strong association between groups when P-value = (.000). as a result of administration of warfarin prophylaxis, postoperative bleeding was occurred in 17 (34%) of case group and 4 (8%) in control group. This result was in

the same way with study conducted by Bell DF et al on 1988 where they found that; In prospective study of 194 patients undergoing elective hip surgery, it showed that; mean maximum PTT in case group was 61.2±13, versus 40±5 seconds in control group. Major postoperative bleeding complications occurred in 26.3% of among cases, versus 4.5% among controls. Furthermore, our findings were in consist with a study carried out by John Martin, M.D.in United States Los Angeles in 2008, which concluded that; Among 2,189 patients on long-term anticoagulant treatment, there were 805 spontaneous bleeding episodes.

CONCLUSION
Partial Thromboplastin Time and Prothrombin Time are Indicators of Hemorrhagic Risk in postoperative patients on warfarin prophylaxis. So, APTT should be routinely investigated in patients on warfarin prophylaxis therapy.

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