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Research Article

**PREVALENCE OF HEPARIN-INDUCED  
THROMBOCYTOPENIA AFTER ACUTE CORONARY  
SYNDROME TREATED WITH LOW MOLECULAR WEIGHT  
HEPARIN VERSUS UNFRACTIONED HEPARIN****\*Dr. Farkhanda Shoukat, \*Dr. Nousheen Fatima, \*Dr. Noreen  
\*Quaid-e-Azam Medical College, Bahawalpur Pakistan****Abstract:**

**Objective:** To compare the frequency of heparin-induced thrombocytopenia with un-fractionated heparin versus low molecular weight heparin use after acute coronary Syndrome.

**Study design:** A Case control study.

**Place and duration of the study:** Department of Cardiology, Nishtar Hospital, Multan from June, 2016 to June, 2017 for one year duration.

**Methodology:** All patients were given low molecular weight heparin (LMWH) or non-fractionated heparin (UFH), which presented with acute coronary syndrome were selected. We recorded data on gender, age, history of exposure to UFH, diagnosis, the time of onset of thrombocytopenia and the type of heparin administered. The platelet counts of all these patients were checked every 24 hours. Clinical scoring was performed for the possibility of heparin-induced thrombocytopenia. By using SPSS version 10.0, the data were analyzed.

**Results:** The frequency of heparin-induced general thrombocytopenia was 2.7%. In the two patient groups exposed to LMWH and UFH, there was a vast variation in the frequency of HIT.

**Conclusion:** The risk of heparin-induced thrombocytopenia is lower with the use of un-divided heparin.

**Key words:** Non-fractionated heparin, low molecular weight heparin, heparin induced thrombocytopenia.

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**INTRODUCTION:**

Heparin is a drug commonly used for treatment of many clinical conditions and used as a thromboprophylaxis, including during invasive procedures and cardiovascular surgery, venous thromboembolism, acute coronary syndromes, peripheral occlusive disease, atrial fibrillation, extracorporeal circulation and dialysis. After seventy years of clinical use, the most commonly used anticoagulant is still heparin. The use of heparin in medical practice increases due to the rise in the frequency of vascular interventions and the aging of the population. It is supposed that up to 31% of hospitalized patients, the duration of their hospitalization and thrombocytopenia (HIT) are reported each year, and the need for heparin types during 600,000 new cases induced by heparin. (HIT) Heparin-induced thrombocytopenia is a common immune-mediated disease to some extent with a capacity for severe thromboembolic complications. It is linked with the use of non-fractionated heparin and may be defined as a decline in platelet count shortly after or during exposure to this anticoagulant agent. HIT is divided into 2 types. Heparin is caused by HIT Type 2 or immunologically mediated thrombocytopenia, HIT type 1 associated with a higher dose, or immune-mediated thrombocytopenia or heparin-induced thrombocytopenia by heparin-bound antibodies. Patients may be lower in some patients (p. G., 30-40%), but typically there is a relative decrease in the number of low platelets (<150,000 per millimeter cube) or 50 percent or more from the beginning. Thrombotic complications develop in approximately 20-50% of patients. A 5 to 10-day delay in patients at risk of exposure is typical,

but there is a sudden drop in platelet count (in hours) in patients with a recent history of heparin exposure.

**MATERIALS AND METHODS:**

This Case control study was held in the Department of Cardiology, Nishtar Hospital, Multan from June 2016 to June 2017 for one year duration. All patients with a diagnosis of acute coronary syndrome (unstable angina and acute myocardial infarction) and low molecular weight heparin (LMWH) or fractionated heparin (SH) were included. Since these conditions led to misinterpretation of thrombocytopenia results, patients with any autoimmune disease or (SLE), connective tissue, chronic liver disease and renal failure were excluded from the study. These data were recorded in age, sex, previously in a proforma form, diagnosis, history of exposure to UFH, heparin type, and when thrombocytopenia (if formed) start time. Platelet counts of all patients included in the study were monitored every 24 hours. Patients were divided into two groups according to whether they received UFH or LMWH. Data were analyzed using Statistical Social Sciences Package (SPSS) version 10 software.

**RESULTS:**

517 patients were included in the study. 393 of them received UFH during the hospital stay and 124 received LMWH. It was suspected that any patient who developed thrombocytopenia (platelet count <100,000 / cm) during or shortly after heparin exposure was determined using heparin-induced thrombocytopenia and HIT probability using a clinical scoring system called "4Ts" 4. 15,16 as shown in Table 1.

**Table 1: Clinical scoring system for heparin-induced Thrombocytopenia**

Parameters	Clinical score		
	2	1	0
Thrombocytopenia	>50% platelet fall	30%-50%	< 30%
Timing of thrombocytopenia	Day 5-10	> Day 10	< Day 4
Thrombosis	Proven new thrombus	Recurrent progressive thrombosis	None
Other possibilities of thrombocytopenia	None	Possible	Definite

Total score 0-3 Low probability; 4-5 Moderate probability; 6-8 High probability of HIT

The majority of patients (65%) were male. The characteristics of the patients are shown in Table 2.

Table 2: Characteristics of the patients

Variable	Value
<b>Mean age (years)</b>	
Male	49 ± 9
Female	56 ± 7
<b>Gender</b>	
Male	n = 338
Female	n = 179
<b>Diagnosis</b>	
Unstable angina	n = 269
Myocardial infarction	n = 248
Mean baseline platelet count ( $\times 10^9/L$ )	208 ± 51
Frequency of HIT	n = 14
HIT in LMWH	n = 1
Hit in UFH	n = 13
Mean time of onset (days) after exposure	7 ± 2
Previous exposure to UFH	n = 1
<b>Decrease in platelet count</b>	
<30%	n = 0
30 -50%	n = 3
>50%	n = 11
<b>Clinical Score</b>	
0 - 3	n = 0
4 - 5	n = 2
6 - 8	n = 12

The frequency of heparin-induced thrombocytopenia was 2.7% according to clinical score. There was a significant difference in the frequency of HIT in two patient groups exposed to LMWH and UFH ( $p < 0.001$ ) (Table 3).

Table 3: Frequency of HIT in patients exposed to LMWH versus UFH

	=n
<b>LMWH</b>	
Hit	1
No hit	123
<b>UFH</b>	
Hit	13
No hit	380

P value <0.001

### DISCUSSION:

Heparin-induced thrombocytopenia is caused by platelet factor 4 (PF4) complexes and antibodies to heparin. These antibodies are present in almost all patients receiving the clinical diagnosis of the disorder. In patients with heparin-induced thrombocytopenia, thrombotic risk is 30-fold higher than control populations. Previously published data indicate a frequency of 0.5 to 5% heparin-induced thrombocytopenia in patients treated with heparin after acute ischemic stroke or acute coronary syndrome. The results of our study are consistent with those previously reported. The disadvantage of our study is that we could not perform the antibody test due to the lack of local facilities. So we only had to rely on clinical scores. In addition, the study

showed that the risk of developing heparin-induced thrombocytopenia decreased significantly with the use of low molecular weight heparin instead of non-fractionated heparin. Increased risk factors for stroke and coronary artery disease, followed by acute ischemic strokes and acute coronary syndrome increase the number of patients requiring anticoagulation. Heparin is an anticoagulant commonly used in hospital settings. To reduce the incidence of heparin-induced thrombocytopenia, the use of LMWH instead of UFH should be encouraged.

### CONCLUSION:

Low molecular weight heparin is a safer alternative to non-fractionated heparin as the anticoagulant because it has a lower risk of heparin-induced

thrombocytopenia.

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