

Frequency of DVT in Lower Limb Fractures reported in patients at PMCH Nawabshah a Tertiary Care Hospital.

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Abstract

Background: The occurrence of DVT in **particular to fracture sites** in the **lower limb** is **generally** unrevealed, and denotes crucial **data essential** to **achieve** the **neediness** for prophylaxis.

Objective: This study was performed for evaluating the frequency of DVT in lower limb fractures.

Design: A large cross-sectional study was performed for evaluating the frequency of DVT in isolated fractures of tibia.

Setting: Orthopedic Department, PMCH Nawabshah.

Duration: September 2017 to June 2019.

Sample size: 200 subjects.

Methodology: All the male and female patients admitted in orthopedic ward after the fracture of lower limb were included. DVT was assessed by the clinical examination and color Doppler ultrasound of lower limbs.

Results: The total number of patients was 200 in this study with age 18 years to 60 years. The mean age in patients was 36.71 with SD 11.51 years, there were 138 (69%) male patients while 62(31%) females, and 56(28%) of patients developed DVT, while rest of the study populace was without evidence of DVT.

Conclusion: Incidence of DVT was not uncommon in lower limb fractures with duration of injury from 3 to 14 days along close fracture.

Keywords: DVT, Thrombosis, Lower extremity fracture.

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Introduction:

The well known complication following to major trauma either surgery or accidental is Deep vein thrombosis (DVT) ¹. DVT is for most common complication of lower limb surgical and immobilization for long period, in 1846 the Virchow described the most risk factor for developing VTE is Virchow's triad. Now a days it is understood that it is consistent with blood flow alteration, vascular endothelial injuries, which results to hypercoagulable state ².

Even after prophylactic treatment the danger to develop DVT in orthopedic surgery after lower limb injury is about 0.25 to 1 % ³. Actually DVT is nothing it means a grume (thrombus) within the lumen of venous system of legs and it is not dangerous till it attached but vein breaks becomes embolus which travels through the circulation system which may become life threatening, when

lodged in lungs. Therefore early diagnosis and treatment of DVT is important to stop this dangerous outcome. Parkash et al, in his study reviewed and analysed that Indian perspective published data is lacking on this topic ⁴. The available reported incident of DVT in lower limb trauma has lower incidents, due to deficiency of attentiveness and interest amongst the clinicians so resulting decreased awareness in patients, along accessibility of tools for diagnosis in our circumstance of the sphere. Therefore most of the cases persist un-diagnosed. In most of the hospitals in our country there is paucity of the required investigations to diagnose these cases such as; D dimer, fibrinogen uptake studies, color Doppler equipments, experts to perform the venography. According to available literature the lower incidents of DVT among Asian population has been attributed to

many factor like complete high fibrino-lytic drive, Activated Protein C entire deficiency, a superior incidence of 'O' blood group, decreased consumption of fat, decrease prevalence of obesity and variances in the climate ^{5,6}. A venous thromboembolism (VTE) consists of DVT (deep vein thrombosis) and embolism (PE). Approximately 0.9 million of American people are affected with VTE each year, with mortality of about 0.03 million, and thus leading to major load of treatment in hospitals. According to literature about 30% having high risk to develop DVT, RVTE in surgical patients with or without dialysis, with an associated fatality risk of 1% ⁷. The well-known complications (VTE or DVT and PE) of lower limb fractures after trauma lead to momentous mortality and morbidity ⁸. The risk of VTE differs with type of fracture, extent of injury, and patients risk factors.⁹ The rationale of this research is the early identification of risk factors in patients who are at risk of developing DVT and proper management of subjects before and after DVT to prevent or decrease morbidity and mortality.

Material and methods:

Objective: Current research was performed for evaluating the frequency of the DVT in lower limb fractures. **Design:** A large cross-sectional study was performed for evaluating the frequency of DVT in isolated tibia fractures. **Setting:** Orthopedic department, PMCH Nawabshah. **Duration:** September 2017 to June 2019. **Sample size:** 200 subjects.

Methodology: All the male and female patients admitted in orthopedic ward after the fracture of lower limb were included. DVT was assessed by the clinical examination and color Doppler ultrasound of lower limbs. This study has been carried out in teaching hospital from September 2017 to June 2019. Initially patients were seen in casualty and outpatient department, after following protocol of admission patients admitted in department of orthopedic surgery where detailed history was carried out which included time of injury, mode of injury, time lapse between admission and injury, treatment which was given at the time of injury and admission and type of injury, associated risk factors for developing DVT such as DM, Hypertension, varicose vein, past history of VTE, use of steroids, addiction of nicotine, alcohol etc, age of patients, any history of bed ridden, the general condition, general physical examination along with local examination of lower extremities was also carried out. On inspection swelling, bruises, blisters,

discoloration, bleeding points, and wound, temperature, tenderness, peripheral pulses and movement. Finally categorized fracture and labeled it according its classification. After completing history and clinical examination patients were managed accordingly either by traction or plaster support till the surgical fitness was given. All the patients of study were subjected to veins color Doppler ultrasound of the affected limb. After positive result the chemo prophylaxis of DVT was started and other all negative patients were remain on non-chemoprophylaxis and mechanical tool. After getting fitness patients were operated as soon as possible and the type of intervention like internal fixation, external fixation, hemi orthoplasty as per need of fracture were put in data. Operative times were also noted. All individuals during stay at hospital were observed for signs and symptoms of deep vein thrombosis; such as edema (pedal), pain in calf, positive Homan's sign (calf tenderness) and erythema. Doppler sonography was performed on 4ht post-operative day in all subjects with history of traumatic lower limb. The examination of bilateral common and superficial femoral, popliteal, anterior and posterior tibial veins was assessed by color Doppler ultrasonography. Flow, thrombus visualization, compressibility and augmentation all were evaluated. The visualization of thrombus with nonexistence of flow, absence of compressibility and also absence of augmentation was diagnosed as deep venous thrombosis.

Data collection and analysis:

Data was collected on written proforma, age, gender and other demographic variables were entered in sheet. Date, time, mode of injury, fracture location, open, close, simple, compound, type, ischemia, nerve involvement were noted and analyzed for qualitative and quantative variables. Frequencies and percentages were calculated, mean and SD were also checked for different variables of study.

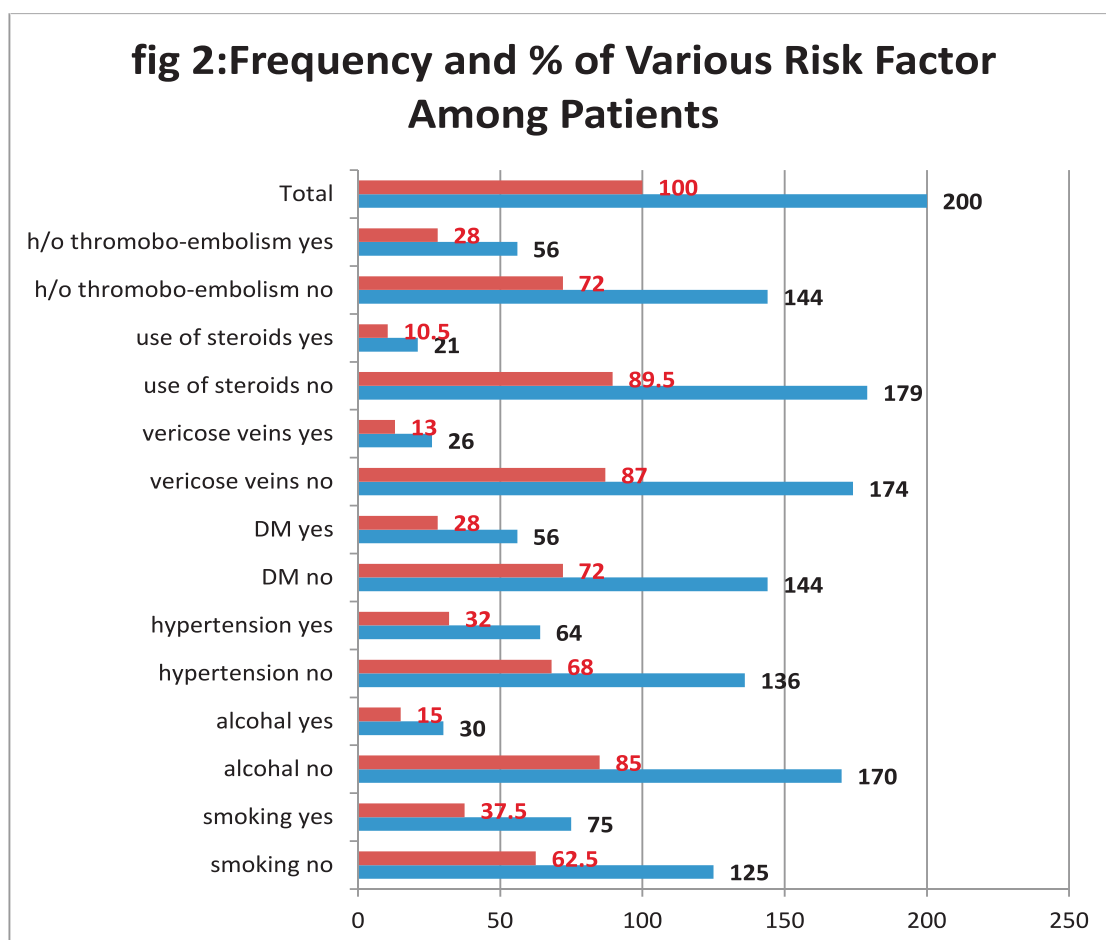
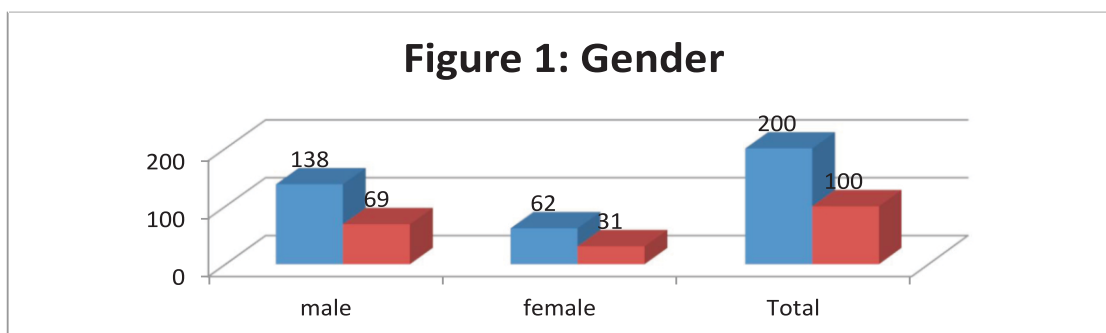
Results: The total numbers of patients were 200, with age ranging between 18 years and 60 years. The mean age in patients was 36.71 with SD 11.51 years as shown in table 1. There were 138 (69%) male patients while 62(31%) females as shown in figure 1. Smoking, HTN, DM and past history of thrombo-embolism were common risk factors identified in present study as shown in figure 2. In 56(28%) of patients developed DVT, while rest of the study populace was without evidence of DVT as shown in figure 3. Location wise the neck and upper part of femur fracture was present in 20%, mid and

lower femur 44%, proximal part of tibia and fibula 35%, mid tibia and fibula 31% and lower end of tibia and fibula 19% as shown in figure 4. Regarding the mode of fracture 66.5% were due to road traffic accidents trauma and rest due to fall, communicated fracture were present in 61% cases, 61% were communicated fracture while rest oblique, 72% were close fractures while rest were open, in 28% cases there were features of nerve involvement while 28% cases have ischemia features, major portion of patients had injury time from 3 to 14 days as shown in figure 5. Table 2 was showing the cross

tabulation with percentage of DVT with days of injury and type of fracture. There was significant statically relation of day and duration with the development of DVT $p < 0.000$ as shown in table 2. The paired sample testing showed significant relationship statistically with 95%

Confidence interval among DVT with mode of injury, fracture type and location, alcoholism, varicose vein and use of steroids $p < 0.000$. while DVT with smoking was $p = 0.004$ and hypertension was $p = 0.171$ as shown in table 3.

Table 1: Descriptive Statistics of Age					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	200	18.00	60.00	36.7100	11.51167



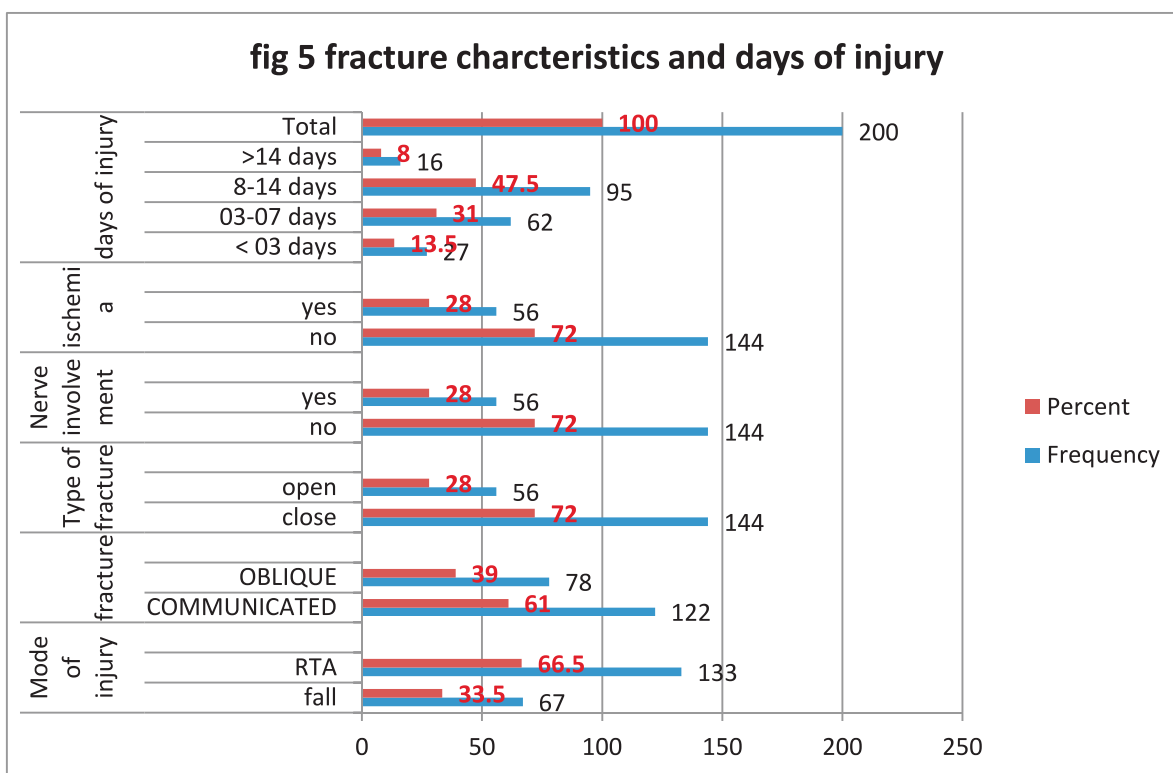
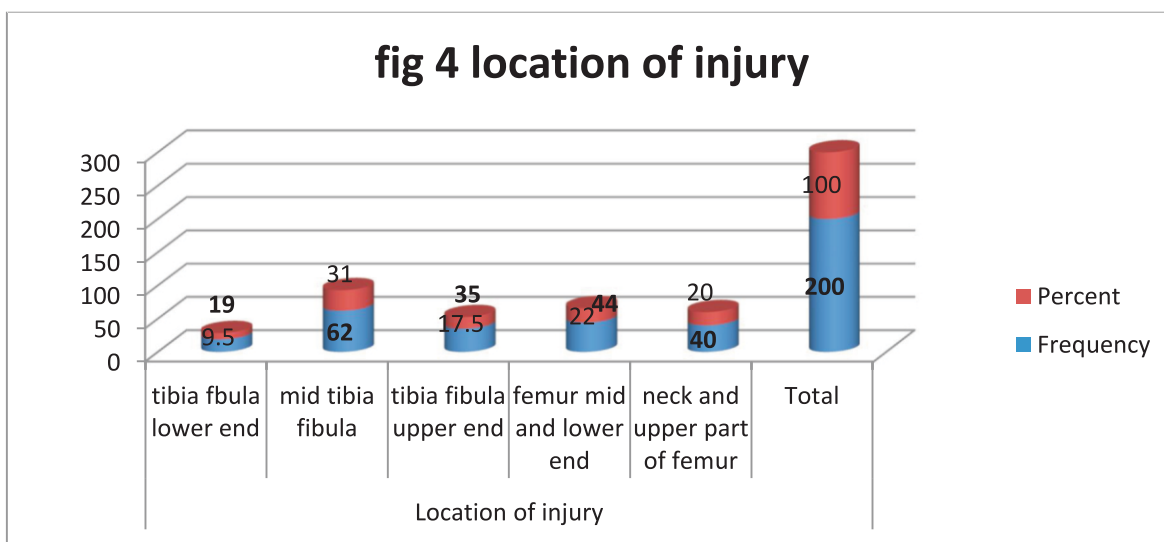
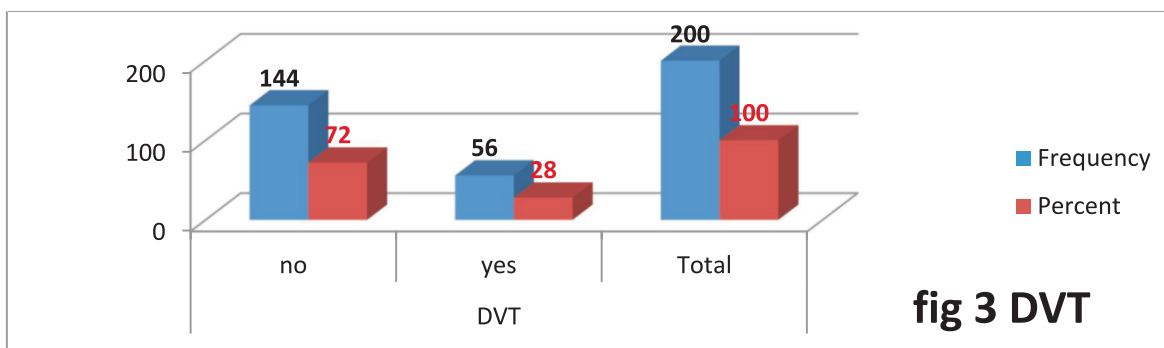


Table 2: Type of fracture * DVT * days of injury Crosstabulation							P VALUE	
days of injury				DVT		Total		
				no	yes			
< 03 days	Type of fracture	close	Count	20	0	20	.000	
			% of Total	74.1%	0.0%	74.1%		
		open	Count	0	7	7		
			% of Total	0.0%	25.9%	25.9%		
	Total			Count	20	7		27
				% of Total	74.1%	25.9%		100.0%
03-07 days	Type of fracture	close	Count	32	0	32	.000	
			% of Total	51.6%	0.0%	51.6%		
		open	Count	0	30	30		
			% of Total	0.0%	48.4%	48.4%		
	Total			Count	32	30		62
				% of Total	51.6%	48.4%		100.0%
8-14 days	Type of fracture	close	Count	80	0	80	.000	
			% of Total	84.2%	0.0%	84.2%		
		open	Count	0	15	15		
			% of Total	0.0%	15.8%	15.8%		
	Total			Count	80	15		95
				% of Total	84.2%	15.8%		100.0%
>14 days	Type of fracture	close	Count	12	0	12	.000	
			% of Total	75.0%	0.0%	75.0%		
		open	Count	0	4	4		
			% of Total	0.0%	25.0%	25.0%		
	Total			Count	12	4		16
				% of Total	75.0%	25.0%		100.0%
Total	Type of fracture	close	Count	144	0	144	.000	
			% of Total	72.0%	0.0%	72.0%		
		open	Count	0	56	56		
			% of Total	0.0%	28.0%	28.0%		
	Total			Count	144	56		200
				% of Total	72.0%	28.0%		100.0%

Table 3: Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Dvt - Gender	-.03000	.53903	.03812	-.10516	.04516	-7.787	199	.432
Pair 2	Dvt - Mode Of Injury	-.38500	.59035	.04174	-.46732	-.30268	-9.223	199	.000
Pair 3	Dvt - Fracture	-.11000	.31367	.02218	-.15374	-.06626	-4.959	199	.000
Pair 5	Dvt - Location Of Injury	-1.84000	1.47488	.10429	-2.04566	-1.63434	-17.643	199	.000
Pair 6	Dvt - Smoking	-.09500	.45498	.03217	-.15844	-.03156	-2.953	199	.004
Pair 7	Dvt - Alcohol	.13000	.33715	.02384	.08299	.17701	5.453	199	.000
Pair 8	Dvt - Hypertension	-.04000	.41140	.02909	-.09736	.01736	-1.375	199	.171
Pair 10	Dvt - Vericose Veins	.15000	.35797	.02531	.10009	.19991	5.926	199	.000
Pair 11	Dvt - Use Of Steroids	.17500	.38092	.02694	.12189	.22811	6.497	199	.000

Discussion:

VTE or DVT (Deep vein thrombosis) and embolism (PE) are the common complications of fracture occurring in lower limbs, due to

surgery as well as extended immobilization. Occurrence of VTE is often elevated in specific as well as in non-specific cases

as shown in published data with metastatic bone ailment and adjuvant treatment. There is paucity of literature on the occurrence of VTE (DVT and PE) as surgical treatment in comparison with osteosynthesis and arthroplasty. Available and advocated anticoagulation procedures may be insufficient to particular category of patients such as in cancer subjects presenting for the surgical interventions like osteosynthesis or arthroplasty. VTE (DVT & PE) secondary to main trauma is the most important cause of morbidity and mortality in subjects who stay alive in the first 24 hours.^{10,11.} The declared incidents of developing DVT among western sphere are 75.00% in TKR, in surgical intervention of hip fracture 60% and in particular surgery of hip 50–55%.¹² In western nations mechanical as well as chemoprophylaxis care is provided to all or any such subject. Asian population remains not practiced can also be due to non-available data of this population. The equal extents involving Indian an (Asians) population shows data of about 63.00%¹³. Only a few researches on the occurrence of VTE in post-traumatic subjects in Indian populace are present.^{14,15.} The occurrence of DVT and PE in secluded ankle and foot fractures on recommended routine prophylaxis was 0.28% and 0.21%, respectively as shown in the analysis of the NTDB by Shibuya et al¹⁶. Intramedullary fixation is generally performed in mid tibia fractures which enable early weight bearing after surgical procedure in comparison to proximal and distal fracture which usually dealt with non-weight bearing implants like plates, external fixation¹⁷. The studies performed previously show the incidence of DVT and PE in fractures at different sites of body instead of particular fracture sites. No

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obvious difference of occurrence of DVT with prophylaxis (chemical) or placebo was noted by Goel et al in below knee fractures, though fractures of tibia plateau has shown increased trend towards VTE¹⁸. Smit Shah observed DVT in 04.8% subjects, out of the each proximal and distal DVT were present in 02.4% subjects¹⁹. Most available literature more often than not analyzed disturbing of DVT in countless fracture²⁰, or the contributing chance elements alongside stay in hospitalization.²¹ In the creation of thrombosis after trauma too many factors play role,^{22,23} such as fracture itself and surgical intervention.^{24,25} It was analyzed that many of the diagnosed subjects post operatively with DVT and VTE had already DVT before surgery. Calf muscle veins are the common site for peripheral DVT²⁶. However the researches done previously on subjects with acute fractures in whom surgical procedure was postponed by >48 hours analyzed that the incidence of DVT in such preoperative subjects varied from 54.00% to 62.00% respectively.^{27,28}

Conclusion

The definite prevalence of DVT subsequent to a lower limb fractures remains underestimated. There was higher occurrence of DVT in preoperative as well as postoperatively.

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Conflict Of Interest: No

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Author contribution: the authors of this research had contributed from design to data and from results and analyses to discussion

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