

Peak Immature Platelet Fraction as a Predictive Marker of Platelet Recovery in Dengue Patients

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Background

The WHO estimates that 50 to 100 million cases of dengue infections occur worldwide every year, which results in 24,000 deaths each year.

A major challenge for clinicians is to assess bone marrow response and time to platelet recovery in thrombocytopenia, and whether or not and when to transfuse platelets in such patients.

Immature platelet fraction (IPF) reflects the rate of thrombopoiesis. There have been studies that suggest that a single IPF value >10% is indicative of platelet recovery within 24-48 hours. However, we have observed in our laboratory that in certain patients, platelets continue to fall even when IPF >20%.

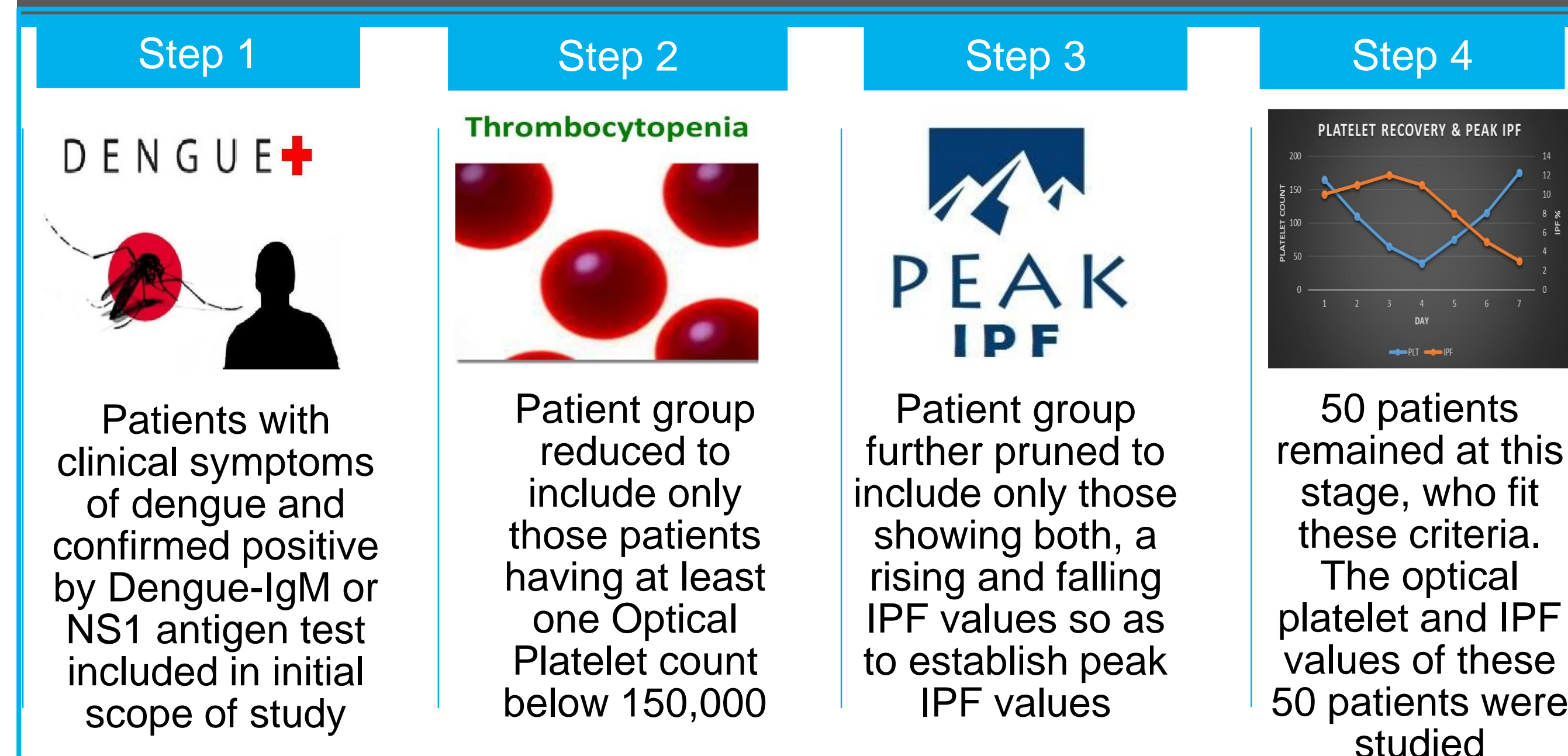
Objective

The rationale of the current study is to establish peak IPF values in thrombocytopenic patients with dengue and try to establish time to platelet recovery from peak IPF values. If majority of patients show platelet recovery within a defined period from peak IPF values, it could be used as a predictive marker for clinical decision making.

Materials

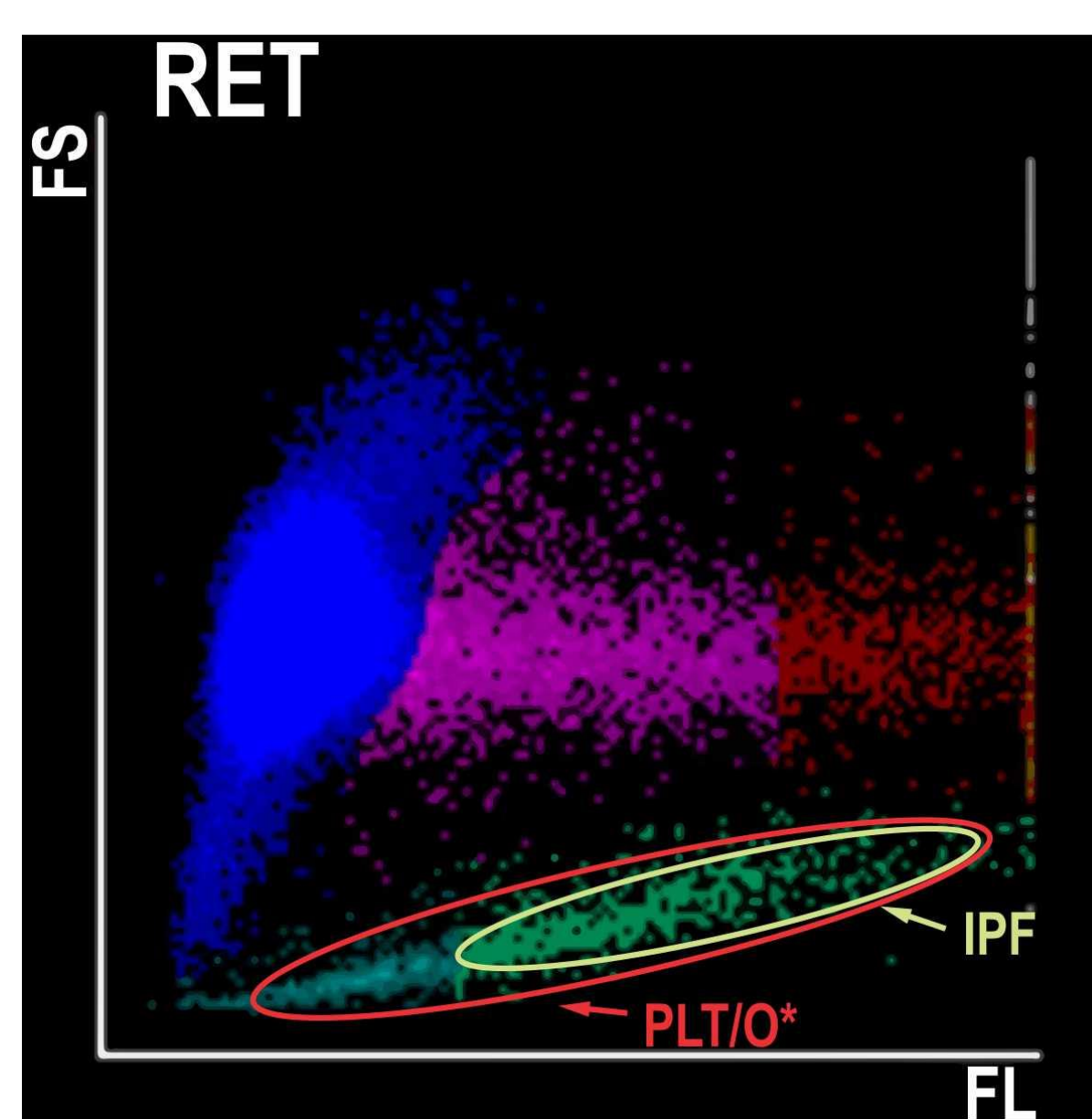
Test parameters	Performed using
Dengue-IgM	Panbio® Dengue IgM Capture ELISA
Dengue NS1 antigen ELISA kit	Bio-Rad PLATELIA™ DENGUE NS1 AG
Optical Platelet and IPF	Mindray BC-6800 hematology analyzer

Methods



PARAMETER	N	MEAN	SD	REFERENCE INTERVAL (+/- 2 SD)	
				LOWER LIMIT	UPPER LIMIT
IPF	992	3.6%	1.5	0.6%	6.6%

Patients with platelet values between 150,000 and 400,000 were considered for establishing reference interval of IPF

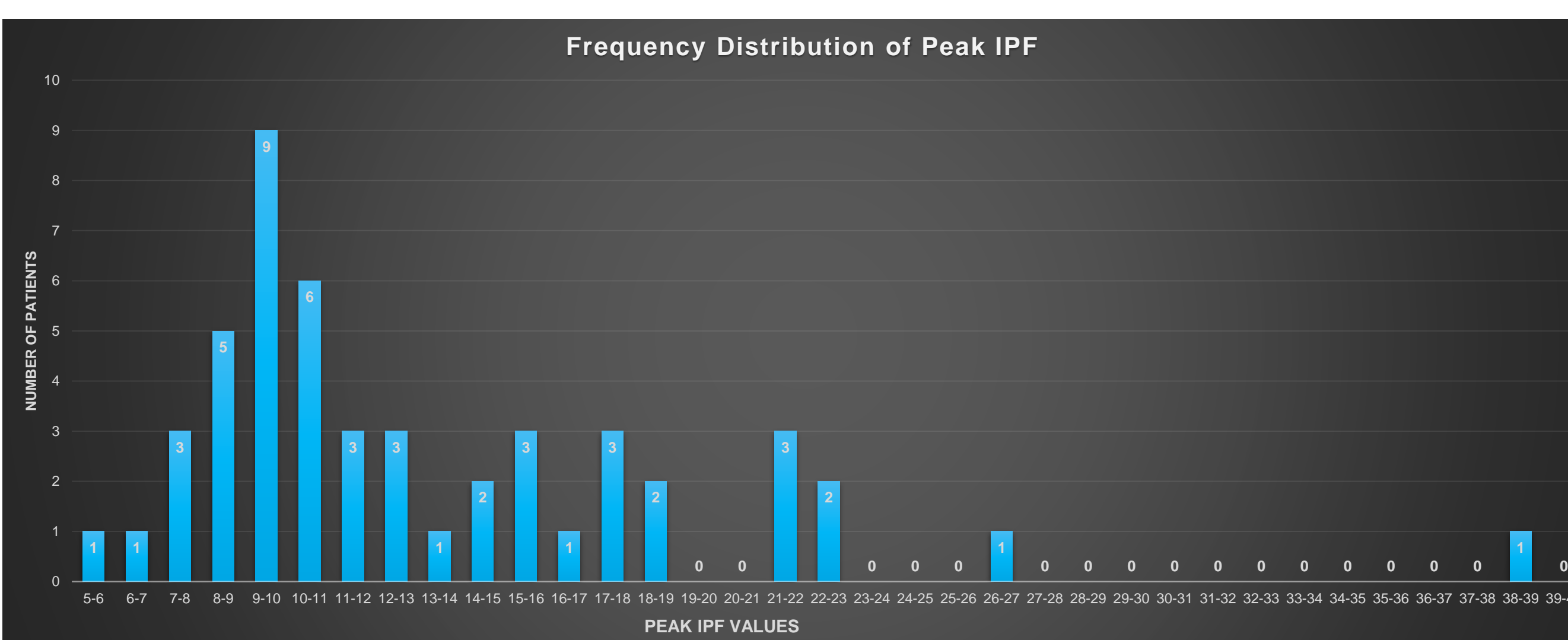


PRECISION STUDY			
PARAMETER	N	MEAN	CV %
PLT-O (Very Low)	10	48.7	6.2
PLT-O (Low)	10	114.1	1.7
IPF (NORMAL)	10	4.95	6.4
IPF (HIGH)	10	41.01	2.7

SMEAR VALIDATION OF PLT-O
All PLT-O counts were validated by smear examination with special emphasis on giant platelets and platelet aggregates

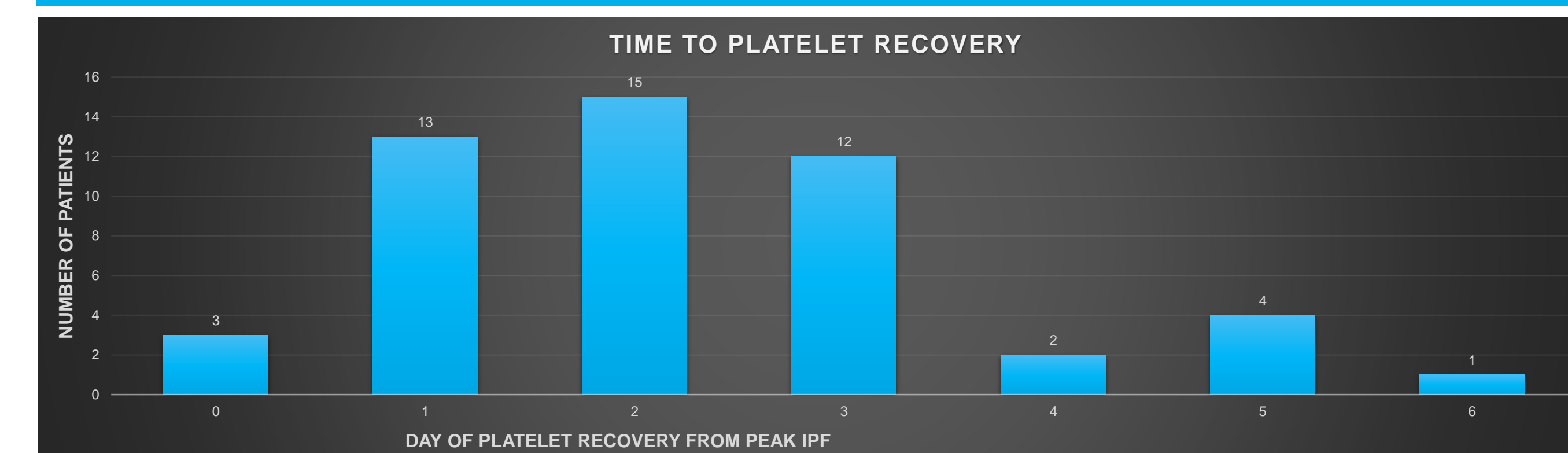
OPTICAL v/s IMPEDANCE PLATELETS
PLT-O has been reported to be more accurate than PLT-I in thrombocytopenic dengue patients

Results

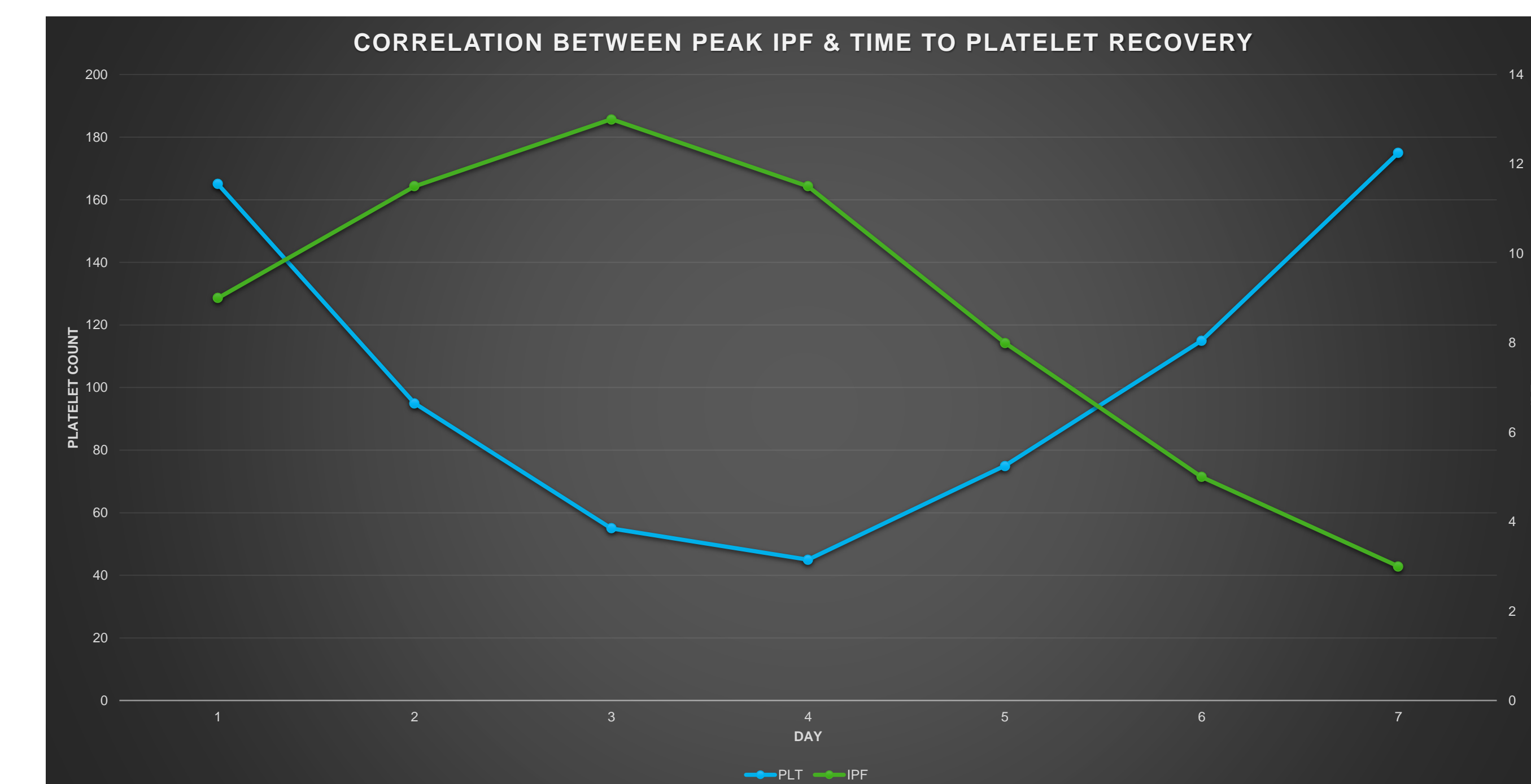


- Peak IPF values of patients ranged from 5.5% to 38.7%, with mean of 13.5% and SD of 6.14
- Six of the seven (86%) patients whose peak IPF values were above 20% were ethnically from West Bengal, Bihar and eastern U.P.

Results (continued)



- 50/50 (100%) patients showed significant platelet recovery after attaining peak IPF values, 43 (86%) of them within 72 hours



- Peak IPF values offered a strong correlation with the time for recovery of platelet counts

Conclusions

- Peak IPF is a promising predictor of time to recovery of platelet counts in thrombocytopenic patients with dengue
- A single IPF value >10% is not a reliable marker for platelet recovery within 24-48 hours
- Peak IPF values in dengue patients of different ethnic groups can be a subject for further study

Glossary

- FL: Fluorescence intensity
- FS: Forward Scatter
- IPF: Immature Platelet Fraction
- PLT-I: Platelet count by Impedance method
- PLT-O: Optical Platelet count in Reticulocyte channel
- RET: Reticulocyte