**Title:**

Platelet receptor levels can differentiate patients with ITP or isolated thrombocytopenia

**Aim:**

Platelet count remains the key diagnostic criteria for immune thrombocytopenia (ITP) however often patients present with severe thrombocytopenia, making platelet functional assessment difficult. Flow-cytometric analysis of platelet adheso-signalling receptor levels and function is a powerful tool in the setting of thrombocytopenia which may provide valuable information about bleeding propensity and treatment responses. We compared levels of platelet surface proteins and platelet function in patients diagnosed with primary ITP against patients with thrombocytopenia due to other causes (non-ITP).

**Method:**

A single-centre study was conducted on 74 cases with platelet counts below 100 x 109/L. Patient data were compared to healthy controls acquired contemporaneously. Whole blood cell counts, rotational thromboelastometry (ROTEM), platelet receptor quantification, and aIIbb3-activation assays were performed using citrate- or EDTA-anticoagulated blood.

**Results:**

Both ITP and non-ITP patient groups exhibited reduced levels of adheso-signalling receptors GPIbα (p=0.0008; 0.0142 respectively), GPVI (p=0.0007, <0.0001) and IIb integrin (<0.0001, 0.0006) which were unrelated to platelet count. P-selectin levels in patients with primary ITP were significantly higher than in healthy donors (p=0.0001) and non-ITPs (p=0.0089) indicating platelet activation. Non-ITP platelets demonstrated reduced IIb3-activation relative to ITP platelets in response to agonists of GPVI (p=0.0010), thrombin receptor (p<0.0001) or ADP receptor (p=0.0381). All patients had reduced extrinsic and intrinsic clot amplitudes (A10) (p<0.0001) in ROTEM. ITP platelet tetraspanin CD9 levels weakly correlated with intrinsic (r2=0.3013, p=0.0122) and re-calcified (NATEM) (r2=0.3473, p=0.0101) clot size as well as with extrinsic (r2=0.3751, p=0.0041) and fibrinogen specific (FIBTEM) (r2=0.3309, p=0.0080) clotting times.

**Conclusion:**

Platelet receptor levels evaluated in combination with functional assays such as ROTEM and a GPVI-mediated IIb3 activation assay can help distinguish primary ITP from other types of thrombocytopenia. Diminution of platelet receptors may contribute to haemostasis dysregulation observed in thrombocytopenia that is not explained by platelet count.