Safety and feasibility of platelet transfusion through long catheters in the Neonatal Intensive Care Unit

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Background:

Babies in Neonatal Intensive Care Unit (NICU) often have central venous access: umbilical venous catheters (UVC) and peripherally inserted central catheters (PICC). PICC lines used in NICU are very small – 28G and 24G.

Babies who need platelet transfusions in NICU can be very unwell – with sepsis, necrotising enterocolitis, neonatal encephalopathy. Unwell babies: issues with vascular access, handling can lead to clinical instability.

Usage of UVC and PICC for platelet transfusion varies in Ireland. Anecdotal concerns about line occlusion, platelet clumping, and platelet activation have been noted as reasons to not transfuse platelets through UVC and PICC

No clear guidelines on using UVCs and PICC lines, no evidence of any potential harm using these lines for platelet transfusions.

Aim: Demonstrate feasibility and safety of transfusing platelets through NICU long lines considering catheter blockage, inline pressure levels and platelet activation

Methods:

Regular male apheresis donors (blood group O^+, CMV antibody positive) prospectively consented. Ethical approval obtained in NMH. Double volume platelet apheresis units collected and analysed at the IBTS National Blood Centre.

Neonatal platelet transfusion was simulated in the laboratory by performing the platelet transfusions as per NICU protocol, into compoflex bags in 37ºC water bath as simulated baby.

We calculated the volume and infusion rate based on a 1000g neonate receiving 15ml/kg platelets over 30 minutes. Statistical analysis was performed with SPSS.

Results:

16 platelet donors donated 32 adult treatment dose units of platelets for **80 in-vitro transfusions of 60ml**

Donor age: between 20 and 61 years old (median: 52)

Donor BMI: 25.5 to 35.5kg/m^2 (median 29.5 kg/m^2)

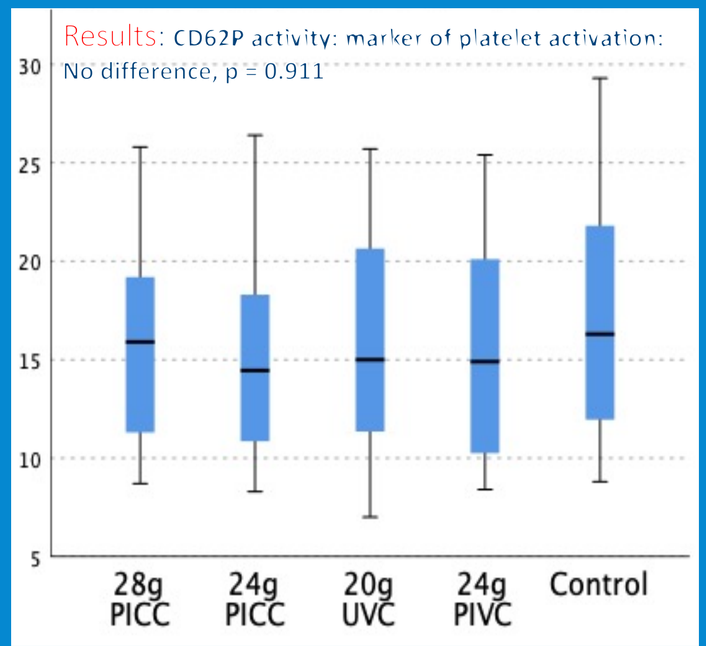
All 80 transfusions completed successfully.

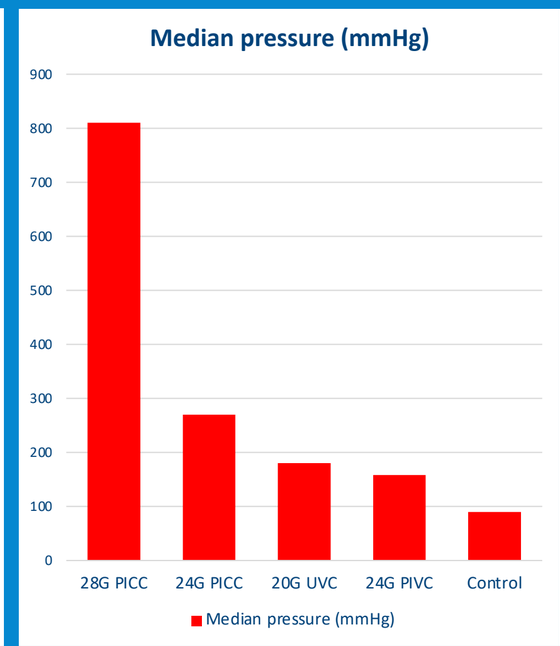
5/16 (31%) transfusions through the 28G PICC line had to have their rate of infusion reduced due to 'Pressure High" (>900mmHg) alarms.

No difference: swirling or aggregates.

Data was not normally distributed, so independent samples Kruskal Wallis test was used to determine if there were any significant differences in the post-transfusion parameters between groups.

There was no difference across or between groups in post-transfusion platelet count, platelet distribution width, mean platelet volume, plateletcrit (PCR) or platelet-large cell ratio (PLCR).





Conclusion:

In-vitro platelet transfusion through 24G and 28G neonatal PICC lines and double lumen UVCs: non-inferior to 24G short cannulas, no evidence of platelet clumping, platelet activation, and no line occlusion. This suggests that this practice could be safe and feasible in the NICU when required, and potentially enable essential platelet transfusion in babies with limited peripheral access options who have central access in situ.

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