Chapter 5

Discussion

The purpose of this study is to test the efficacy of normal saline for partial exchange transfusion in polycythemic neonates when using fresh frozen plasma as gold standard. Our finding has shown that there was no failure rate at all in both study groups. The hematocrit has come down below 65% despite the maximum pre-exchange hematocrit of 77-78% in both groups. The result may not be generalized to infants with hematocrit higher than 78%.

There was statistically significant difference in mean hematocrit at immediate post exchange between the study groups, being that mean hematocrit in plasma group was lower than in saline group. Also the magnitude of hematocrit decreasing for plasma was larger than normal saline group. The mechanism is speculated to be due to protein and coagulation factors in plasma might be able to separate and remove the red blood cells better than normal saline[17]. Therefore, the efficacy of normal saline was still inferior to plasma, but it was of non - clinical significant, because none of the baby in each group needed to be re-exchanged despite of the fact that mean immediate post exchange hematocrit were different.

The keystone of this study was the timing to start the partial exchange in the two study groups were not different but they were in favour of saline group most likely due to additional time needed to thaw frozen plasma. Hematocrit immediate pre-exchange was used to be the baseline. This way would avoid problems of incomparable hematocrit immediately before pre exchange due to the spontaneous dilutional effect during waiting

for the cross match for plasma in the plasma exchange group. Plasma AB. was kept as available as normal saline for the immediate partial exchange. In our study processing time were comparable. In other studies [15,16], there was no mention of timing at all. Non-comparable timings were important confounding factors.

There was no complication happening during the procedure in both study groups. Side effect events in both groups were comparable, although hypoalbuminemia events in saline group were almost twice of plasma group, it was non-significant difference most likely due to small sample size. Unfortunately, we did not reach 90% power adequately to express with more confidence that the events of side effect will not be sigmificant difference at highest power. The magnitude of hypoalbuminemia was very small, closed to normal limits. Other events of blood chemisty derangement also were very small and closed to physiologic limits.

It was very difficult to collect 24 hours urine output in the neonates. The obstacles were due to the workload in the nursery and the collection technique. Therefore, the 24 hours sodium excretion could not be obtained. However, by looking at the 24 hours weight change it could tell us roughly the normal physiologic weight loss that comparable between study groups[17]. There should be no sodium retention in the infants in both groups.

Our result was different from Tapia et al[15] result most likely due to Tapia's small sample size of the study and different timing that was not shown in his study. The hallmark in Tapia's study was the viscosity that was lacking in our study[15]. We were planning in doing viscosity also but the study would extend to be at least 3 years to finish for the sample size that required. However, there was a linear correlation between hematocrit

≥70 and viscosity[1], therefore, viscosity is not necessary to obtain in routine practice.

The study time in this experiment was quite short. We were unable to show the follow-up result that would take 3-5 years to finish to see whether the infants in each group were comparable in neurodevelopmental finding.Reports of studies on long term outcome could be divided into two groups. Studies of infants identified because of their symptoms revealed that approximately 25% had significant neurodevelopmental abnormalities[20,21]. Infant identified by screening had far fewer neonatal symptoms and might therefore have a different outcome. Goldberg et al found neurologic abnormalities in 25% of the polycythemic infant identified by neonatal screening at age 25 months[9,22]. Their result were in conflict with the study of Van der Elst et al. Who found no neurodevelopmental problems in any of the studied patient and normal control infants they saw at eight months of age[22].

We did not have normal control group without partial exchange to compare the longterm follow-up with the study groups. Therefore, we have to use neurodevelopmental quotient score in general population to compare with.

For economic study, cost - minimization analysis, has shown that with the control for processing timing and no cross matching cost for AB plasma the normal saline is still 1149.07 baht cheaper than fresh frozen plasma. In real prectice without controlling for processing timing and without AB plasma the cost for plasma for partial exchange transfusion will be a lot more expensive.

Though normal saline is somewhat inferior to fresh frozen plasma for partial exchange transfusion in polycythemic neonates, there was no failure rate if use in the treatment of the infant whose hematocrit was

between 70-78%. When high cost and long term complications of plasma such as viral contamination was taken into account, normal saline should be still far better beyond plasma for the treatment of polycythemia.