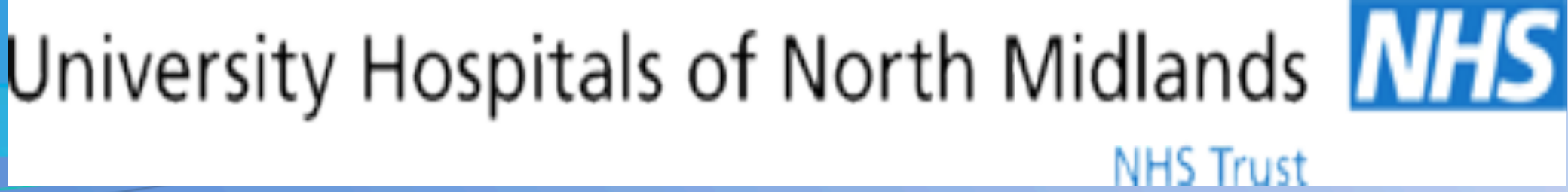


Evaluation of Hemosep® Cell Salvage Device in Cardiac Surgical Patients

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Introduction:

The aim of our study was to evaluate the effectiveness of the Hemosep® system (Advancis Surgical, Nottingham, UK) as an alternative blood cell salvage technique in adult cardiac surgical patients. Hemosep® is a novel blood conservation system that utilizes **ultrafiltration and hemo-concentration** to salvage the residual whole blood in the extracorporeal circuit post cardiopulmonary bypass (CPB).¹

Methods:

Design: Prospective study

Setting: University teaching hospital.

Participants: 15 adult patients undergoing elective aortic valve replacement or coronary artery bypass surgery were included from February to October 2014.

Procedure and data collected: The anesthetic, surgical and bypass techniques were standardized for all operations. After termination of CPB, the residual volume in the CPB circuit was received in the Hemosep® bag and processed by placing on shaker unit. Patient blood samples were taken at preoperative and intraoperative (pre-Hemosep® and post-Hemosep®) periods for full blood count, clotting studies and Activated Clotting Time (ACT). Blood samples were also taken from Hemosep® bag before and after processing for analysis. Data on postoperative transfusion events, postoperative complications, duration of ICU stay and hospital length of stay were collected and compared against the results of our standard practice. Statistical evaluation was performed by Students t-test and Wilcoxon signed-rank tests.

Results:

Patients who received Hemosep® blood had a mean increase of hemoglobin of 10.8 g/L and this was statistically significant (p=0.036)*. The length of stay in ICU was shorter by 1 day in Hemosep® group. There was no difference in transfusion rate of red blood cells as compared to our standard practice.

Table : Demographics and CPB Time (n=15)	
Age (years)	67±9.1
BMI (kg/m²)	30.4± 3.8
Female	1(6.7)
Euro Score II	1.7± 0.9
CPB Time (minutes)	71.2±26.7
Continuous variable shown as mean ±SD : Categorical variables shown as frequency %	



The Hemosep® technology. 1.Hemosep®bag, 2. Hemosep® Shaker, 3.The blood collection bag, 4. Blood reservoir, and 4. Suction tool

Hemosep®

- Preserves red cells, platelets, White blood cells, clotting products
- **Green Technology** - Gelatinous waste products Easy to dispose
- **Simple**

Membrane controlled superadsorber driven plasma removal technology

Table : Patient blood results at various time points					
	Pre-operative	Pre Hemosep ® Transfusion	Post- Hemosep ® Transfusion	Post Operative Day 1	P-value Pre vs Post Hemosep ® Transfusion
Hemoglobin g/L	132.7 ± 14.6	93.1 ± 13.2	103.9 ± 13.6	101 (89, 105)	0.036*
Hematocrit %	39.2 ± 4.8	27.5 ± 3.7	30.7 ± 4.0	29.3 ± 3.0	0.031*
WBC x 10 ⁹ / L	8.1 ± 2.2	11.9 ± 5.4	14.2 ± 5.9	11.1 ± 2.0	0.29
Platelets X 10 ⁹ /L	237.7 ± 78.1	157.2 ± 55.5	191.4 ± 61.4	196.5 ± 67.3	0.12
Fibrinogen g/L	2.92 ± 0.41	1.90 ± 0.35	2.06 ± 0.34	2.91 ± 0.48	0.23
ACT (seconds)	119.3 ± 9.6	109.2 ± 9.2	119.8 ± 17	126.4 ± 11.8	0.043
Values expressed as mean ± SD for normally distributed variables and median (1 st quartile, 3 rd quartile) for non-normally distributed continuous variables					
*Statistically significant					

Table : Outcomes			
Outcomes	Hemosep Patients Average (Range)	Standard UHNM Results Average (Range)	Change
Length of stay in ICU (days)	1.9 (1-4)	2.9 (1-28)	-1 day
Length of stay in Hospital (days)	9.7 (4-21)	9.8 (3-47)	-0.1 day
Transfusion Rate	33%	33%	No change

Conclusions:

Hemosep® system may be beneficial as an alternative cell salvage technique in low risk cardiac surgical patients.

References:

- 1) Gunaydin S and Gourlay T. Novel Ultrafiltration Technique for Blood Conservation in Cardiac Operations. *Ann Thorac Surg* 2013; **95**: 2148-51.
- 2) Hogan M, Needham A, Ortmann A, *et al.* Hemoconcentration of residual cardiopulmonary bypass blood using Hemosep®: a randomized controlled trail. *Anesthesia* 2015; **70**:563-70.

Acknowledgement:

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Conflicts of Interest:

We received disposables for the study from Advancis Surgical.

Discussion:

The results showed that Hemosep® patients had higher postoperative hemoglobin despite no change in transfusion rates. The patients were discharged from ICU one day earlier and this may have implications for critical care bed utilization. Our results differ from Hogan² et al who concluded that Hemosep® did hemoconcentrate CPB residual blood but this was insufficient to increase patient haemoglobin. As the numbers in our study are small, further studies are needed to o investigate our findings.