

Clinical efficacy of washed autotransfusion in non-cardiac settings such as vascular, orthopedic and obstetric surgery: subgroup analysis of a systematic review and meta-analysis of randomized control trials

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INTRODUCTION

- **Washed autotransfusion (w-ATS) is a contemporary blood management strategy** that is widely used in cardiac surgery and **recommended by the American Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists.**
- Nevertheless, it is **not universally utilized in many non-cardiac applications despite its potential benefits** in reducing red blood cell transfusion and improving patient outcomes.

OBJECTIVE

- A **systemic review and meta-analysis** investigated the **efficacy of intra and/or postoperative w-ATS in reducing allogeneic blood transfusions during major surgical procedures other than cardiac surgery**, such as orthopedic, vascular and obstetric surgery.

METHODS

SEARCH METHODS

- A literature search was performed in Pubmed for randomized controlled clinical trials (RCT), published before September 2016, comparing:
 - w-ATS vs. standard suction drainage, or
 - w-ATS used with other active strategies intended to minimize allogeneic transfusion* vs. the same active strategies.

PRIMARY OUTCOME INVESTIGATED

- **Risk ratio (RR) for allogeneic blood transfusion** in the w-ATS group compared with the control group.

SECONDARY OUTCOMES INVESTIGATED

- Mean difference (MD) between w-ATS and control group of:
 - **packed red blood cells (PRBC) units transfused**
 - **total blood loss**
 - **post-operative hemoglobin levels**
 - **length of hospital stay (LOS)**

* The considered active strategies intended to minimize allogeneic transfusion are: use of topical hemostatic agents (Thompson, 1990); preoperative autologous donation (Mah 1995); use of treatment for anemia (Liang, 2015 and Springer 2016); acute normovolemic hemodilution and allowing for moderate hypotension during bleeding (Lisander, 1996).

RESULTS

SEARCH RESULTS

- 21 RCTs comprising of 1.922 patients who underwent w-ATS in different surgical settings:
 - 15 RCTs in orthopedic surgery
 - 5 RCTs in vascular surgery
 - 1 RCT in obstetric surgery

First author, year	Risk Ratio	Risk Ratio	[95% CI]
Comparison group=Active control*			
Mah ET, 1995		0.62	[0.43; 0.87]
Liang J, 2015		0.44	[0.21; 0.94]
Springer BD, 2016		0.61	[0.15; 2.44]
Random effects model		0.58	[0.43; 0.79]
Comparison group=Standard control*			
Elawad AA, 1991		0.35	[0.18; 0.69]
Slagis SV, 1991		0.63	[0.39; 1.00]
Kelley Patteson C, 1993		1.33	[0.35; 5.13]
Rollo VJ, 1995		3.42	[0.14; 81.38]
Farrer A, 1997		0.14	[0.05; 0.39]
Shenolikar A, 1997		0.20	[0.10; 0.38]
Rainaldi MP, 1998		0.13	[0.02; 0.95]
Avall A, 1999		0.08	[0.00; 1.14]
Clagett GP, 1999		0.92	[0.70; 1.19]
Thomas D, 2001		0.37	[0.20; 0.67]
Mercer KG, 2004		0.69	[0.49; 0.98]
Savvidou C, 2009		0.49	[0.33; 0.73]
Cip J, 2013		1.00	[0.62; 1.61]
Sarkanovic ML, 2013		0.09	[0.04; 0.21]
So-Osman C, 2014		0.93	[0.67; 1.28]
Random effects model		0.47	[0.33; 0.66]
Random effects model		0.49	[0.36; 0.65]

PRIMARY OUTCOME

- The use of autotransfusion **significantly reduced the risk of exposure** to allogeneic blood transfusions by as much as **51%**
- **Stratified analyses** according to type of the comparison group (standard vs active treatment), type of surgery (orthopedic vs. vascular) and year of publication (<2000 v.s ≥2000) **revealed similar protective effect of w-ATS across strata. However, it reveals that it is more beneficial** in reducing exposure to allogeneic blood in programs using restrictive transfusion protocols (Hgb < 8.5 g/dl)

SECONDARY OUTCOMES

- **W-ATS appears to reduce the number of PRBCs by 1.1 units and the LOS by 1.0 day**
- No significant difference highlighted for post-operative Hb levels and total blood loss

Outcome	No. of study	Pooled mean difference (95% CI)	P-value
RBC unit transfused (units)	15	-1.14 (-1.67, -0.61)	<0.001
Postoperative Hb levels (g/dL)	12	0.14 (-0.12, 0.40)	0.29
Hb Delta Pre-Day 1 (g/dL)	12	0.29 (-0.03, 0.61)	0.076
Total Blood Loss (mL)	12	-42.34 (-109.78, 25.09)	0.22
Length of hospital stay (days 9)	10	-1.01 (-1.90, -0.13)	0.024

CONCLUSION

- The use of **washed autotransfusion in non-cardiac settings** such as vascular, orthopedic and obstetrics surgery significantly **reduces the risk of exposure to homologous blood products regardless of the surgical settings, the type of comparison group and the study period.**
- In addition, the protective effect of w-ATS on the risk of allogeneic transfusion is found to be significantly greater when adopting a restrictive transfusion policy, rather than those studies with a less restrictive policy.
- Wash autotransfusion should be considered as an essential technique to be integrated in the Patient Blood Management program within the hospitals.



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