

Utilization of Cell Salvage in Jehovah Witness patients during Cesarean sections to reduce post operative complications of hemorrhage

Clinical scenario: 30 yo G1P1 at 39wks gestation presents for routine repeat c-section. She is a Jehovah Witness and does not consent for use of allogeneic blood products in the case of complications during the surgery. She loses approximately 1500cc during the operation and continues to bleed post-operatively in recovery. Inability to stop bleeding results in emergency hysterectomy and 1500cc blood loss. She is transferred to the ICU where she passes hours after the surgery. Could have perioperative cell salvage saved her life?

Type of clinical question: Intervention

PICO-model clinical question: P: Jehovah witness population; I: Intraoperative cell salvage (IOCS); C: need for blood transfusion; O: Life saving resuscitation or avoidance of cardiovascular collapse

Search strategy and search results

- Peripartum + cell salvage
- Cell Salvage + Obstetrics

Brief critical appraisal: I chose these three articles because the first systematic review looked at the IOCS across all surgical fields, the retrospective case series showed positive outcomes with obstetric surgeries which were known to have hemorrhagic complications and the second systematic review looked at the utilization regionally in the UK and Scotland where many of the case reports seem to be coming from.

Publication	Patients	Study type	Interventions	Outcomes	Key relevant results	Strengths (s) and weaknesses (w)
Ashworth, <i>et al.</i> PMID: 20802228	• Obstetrics	• Systematic review	• IOCS	<ul style="list-style-type: none"> • Many societies endorse IOCS use during obstetric cases • Utilization of IOCS appears to be well studied in all surgical subspecialties 	<p>Several studies demonstrated IOCS:</p> <ul style="list-style-type: none"> • may decrease mortality • may be more cost effective than allogeneic transfusions • decreases transfusion associated complications which can arise from allogeneic blood products • causes concern for iatrogenic coagulopathy if loss of blood >3L due to filtration of platelets and clotting factors • does not increase risk of AFE, infection or DIC • Jehovah's Witnesses will allow IOCS use intraoperatively as long as consent is obtained 	<p>(s) IOCS is thought to be beneficial if there is a known complication in which >1000ml blood loss is expected.</p> <p>(s) Use of special filter (leukocyte depletion filter) minimizes the risk of allo-immunization and AFE</p> <p>(w) Most common types of hemorrhage are unexpected (uterine atony)</p> <p>(w) most obstetric studies utilized were 2+ or 2- (case control or cohort studies with moderate to low probability that relationship is causal or high probability that relationship is not causal, respectively)</p> <p>(w) limited number of RCT in this area of research</p>
Tevet, <i>et al.</i> PMID: 22139445	• Obstetrics	• Retrospective case series	• IOCS	<ul style="list-style-type: none"> • All cases which initially used IOCS still required allogeneic products due to iatrogenic coagulopathy 	<ul style="list-style-type: none"> • All cases have known hemorrhagic complication (accreta). • No complications related to IOCS noted, including clinical or laboratory evidence of AFE • All case subjects survived with no sequelae of hypovolemic shock • IOCS not practical to use unless there are 	<p>(s) successful utilization of IOCS during c-hyst without IOCS complications</p> <p>(s) IOCS utilized quickly and effectively while waiting for other blood products to be prepared</p> <p>(w) No control group utilized for comparison</p> <p>(w) immediate post-operative and hos-</p>

					other surgical specialties that utilize it as well. Systems require trained personnel (problematic if system and operators are not always available)	pital course not addressed (w) patients required allogeneic transfusion regardless of IOCS
Wise, <i>et al.</i> PMID: 20110196	• Obstetrics	• Systematic review	• IOCS	<ul style="list-style-type: none"> • Covers all options available for post-partum hemorrhage and acknowledges IOCS as one of the options • Emphasizes the need for a multicenter RCT 	<ul style="list-style-type: none"> • Over 400 case reports on IOCS use without complications. • Known cost reduction when used compared to allogeneic blood products • Limited experience, training and maintenance are problematic where IOCS is already acceptable practice 	<p>(S) systematic review show there are 400+ case reports where IOCS was used without complications</p> <p>(w) best evidence is still limited to case reports and minimal case-control studies showing the need for RCT studies which may help support or refute routine use.</p> <p>(w) showed major setback to utilization of this technique: limited equipment, proper training, education and maintenance of equipment</p>

Application to the clinical question: IOCS offers many benefits, such as decreased transfusion related reactions, mortality and cost when compared to allogeneic blood products, IOCS usefulness in obstetrics may be difficult to establish. This is largely due to the unpredictable nature of post partum hemorrhage. Though 400+ case reports have yielded zero complications, the lack of RCT to support or refute routine IOCS use in obstetrics, leads to cautious practices in those facilities equipped for this procedure. IOCS shows potential in Jehovah's witness populations but is limited by its inability to provide platelets and clotting factors. Observations show iatrogenic coagulopathy will occurs with severe hemorrhage >5L, requiring FFP or platelet infusions. Given this information and the known religious convictions within this population, IOCS may have limited value until research in this area establishes routine practice guidelines and ways to prevent iatrogenic coagulopathy. However, given the prevalence of post partum hemorrhage, many societies have included IOCS within acceptable management options and should be provided as an option to special populations.