

What Is Blood and What Is Not? Caring for the Jehovah's Witness Patient Undergoing Cardiac Surgery

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The definition of what blood is has changed throughout history. In ancient Greece, Hippocrates characterized it as one of the four humors, along with yellow bile, black bile, and phlegm. In the 18th century, William Hewson correctly described blood as "spherical red particles that pile up like coins (which are) diluted with serum." Today, with our powerful electron microscopes and other molecular probes, we can see many more "particles" that make up the solution(s) we know as blood. By applying advanced isolation techniques and recombinant technology to these molecules, we are beginning to blur the lines between drug and blood products.

Defining blood takes on a special importance when dealing with the Jehovah's Witness (JW) patient population. Most anesthesiologists are familiar with this group's policy of blood refusal, even at the expense of greater morbidity and mortality. What most clinicians are not aware of, however, is the JW definition of blood. In the year 2000, and again in the year 2004, The Watchtower Bible and Tract Society, the official voice of the religion, defined the "primary components" of blood as red blood cells, white blood cells, platelets, and plasma (1,2). It came as no surprise to the medical community that members were told that transfusion of these specific products was forbidden. What has gone largely unnoticed by many anesthesiologists, on the other hand, is that the acceptance of fractionations of the primary components was left to the individual believer.

Many products commonly used in medical practice fall into the JW category of potentially acceptable blood fractionations. Immunoglobulins, albumin, and purified Factors VIII and IX (called "hemophiliac preparations" by religious leaders) have been available since 1978 to JW followers whose "conscience would permit such." (3). Interestingly, erythropoietin is actually solubilized in a solution that contains human serum albumin.

The key for anesthesiologists, especially cardiac anesthesiologists, is to have a thorough preoperative discussion about what fractions of the primary components are available and which ones the individual JW patient is agreeable to accepting. During the discussion, it may be helpful to know that JW leaders have informed their members that "some protein fractions from plasma do move naturally (from mother to fetus) which may be another consideration when a Christian is deciding (about what fractions to accept)" (4). One could surmise that this opens the door for many isolated protein preparations, such as thrombin concentrates and cryoprecipitate. Unfortunately, most JW patients do not know these options exist, or how they might be beneficial, let alone ask for them.

As well as blood components, it is also necessary for anesthesiologists to discuss blood salvaging measures based on the surgical procedures. JW patients are prohibited from preoperative autologous blood donation and will not allow their blood to be stored in separate containers, regardless of the length of time. However, techniques have been described for both cell saver use and acute normovolemic hemodilution that keep the patient's blood in continuity with the circulation (5,6). In procedures using cardiopulmonary bypass, the use of low-prime circuits and autologous priming

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Table 1. Measures Used to Treat Jehovah's Witness Patients Undergoing Cardiac Surgery

Blood conservation techniques	Hemopoetic/hemostatic agents
In-line ANH (6,8,9)	Erythropoietin and iron (10,11)
Intraoperative cell scavenging (5,8,9)	Aprotinin (10)
Low-prime CPB circuits (7)	Desmopressin (11)
Retrograde autologous priming (7-9)	Factor VIIa (12)
Reinfusion of arterial/venous lines (9)	

Note that measures such as intraoperative cell scavenging (cell saver), in-line acute normovolemic hemodilution (ANH), preoperative erythropoietin, and aprotinin use have been reported numerous times in the literature by multiple authors.

has been described and may be beneficial (7). Table 1 summarizes a list of techniques that have reportedly been used to successfully manage JW patients undergoing cardiac surgery.

These patients are hardly a new development. In 1977, Drs. Ott and Cooley (13) reported on 542 cardiovascular operations on JW patients, both with and without cardiopulmonary bypass. Since then, new techniques and preparations have become available that may benefit this patient population. Yet instead of educating each individual patient and allowing them to decide what may be acceptable, many hospitals treat this group collectively according to what they believe is the church's official guidelines, even though advances in component therapy and changes in JW policy have broadened the options available to JW patients.

As cardiac anesthesiologists, it is our job to present these options, and allow the individual patient to decide what is acceptable and what is not. It is only by understanding each believer's own definition of blood that we can provide the best care for JWs undergoing cardiac surgery and other surgical procedures in which there is significant risk for blood loss. Further development of novel strategies, including blood substitutes, recombinant, and transgenic alternatives to

blood products, offer additional therapeutic approaches to treat bleeding in this patient population (13-16).

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