Jehovah’s Witness Parturient: Ethical Dilemma and Anesthetic Management

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Objectives

Upon completion of this lecture, the participants should be able to:

- Appreciate the Jehovah’s Witnesses’ belief on blood transfusion.
- Understand the 4 ethical principles involved in medical decision
- Discuss alternative options and management available to the medical community for a patient refusing blood transfusion
Case Presentation

- You were just “minding your own business” when an OB colleague mentioned that he wanted you to know about “an interesting patient”….

- 23 y.o. Jehovah’s Witness parturient, G₃P₂ with previous C/Sec X 2.
JEHOVAH’S WITNESS???
Questions

• Why would you care if the patient is a Jehovah’s Witness?

• What are their beliefs?
History of Jehovah’s Witnesses

• 1872 by Charles Taze Russell in Pennsylvania (Bible Students)
• Watch Tower Bible and Tract Society
• 2015 statistics: >7.9 millions worldwide, >1.5 million USA
• Literal interpretation of the Bible, some symbolic
• View on blood:
  – Genesis 9:3-4
  – Leviticus 17:10-16
  – Acts 15:28-29
History of Jehovah’s Witnesses

• Joseph Rutherford, second president of Watchtower Society 1916-1942
  – 1931, changed to Jehovah’s Witnesses
  – Predicted uses of blood as heroic and the Lord’s work
  – 1925 The Golden Age Magazine, commended member (B. Tibble) who donated blood on 45 occasions
History of Jehovah’s Witnesses

• Nathan Knorr, succeeded Rutherford in 1942
• 1945, *Watchtower:*
  
  **not by taking such blood directly into the human body; therefore it behooves all worshipers of Jehovah who seek eternal life in his new world of righteousness to respect the sanctity of blood** and to confirm themselves to God's righteous ruling concerning this vital matter.

• No punitive measures for accepting blood transfusion was mentioned
Jehovah’s Witness Belief

• JW believes that eternal salvation is forfeited if given blood transfusion even in case of emergency
  – *Moreover, ye shall eat no manner of blood, whether it be of fowl or of beast in any of your dwellings; whatsoever soul it be that eateth any manner of blood, even that soul shall be cut off from his people.* (Leviticus 7:26,27)
  – *Behold the people sin against the Lord, in that they eat with the blood* (I Samuel 14:33)
Jehovah’s Witness Belief

- By 1961, individuals who “partake” blood can be “disfellowshipped” and at risk for eternal damnation and loss of Jehovah’s favor.

- **Watchtower 6/15/2000**
  - Blood fractions
  - “A Christian must make his own conscientious decision before GOD”
  - Voluntary disassociation from church if accept blood but can remain in church if repent.

- Wide range of believers: orthodox to moderate
- “dissident” group: Associated Jehovah’s Witnesses for Reform on Blood (www.ajwrb.org)
Jehovah’s Witness Belief

• Help for the medical personnel
  – Local church
  – his@jw.org
  – Hospital Information Services- USA (24hr service): 718-560-4300 or International Office of Jehovah’s Witnesses (+1 718-560-4700)
  – Hospital Liaison Committee – local
  – Advance Medical Directive/Release card
  – Hospital designation as Center for Bloodless Medicine & Surgery
  – Society for the Advancement of blood management (www.sabm.org)
Ethical Considerations

• “Is it worse to let them die if they need a blood transfusion, or sentence them to eternal damnation?”  
4 Ethical Principles

1. Autonomy

2. Beneficence

3. Nonmaleficence

4. Justice
Ethical Principles

• **Autonomy**
  – “Self rule”
  – Right to choose or refuse recommended treatment
  – Foundation of informed consent

• **Beneficence**
  – “Doing good”
  – Physician/healthcare provider must act in manner that benefits the patient
Ethical Principles

• Nonmaleficence
  – Obligation not to harm or cause injury
  – *Primum non nocere*

• Justice
  – Rendering what is due to others
  – Most complex principle
  – Physician/patient relationship
  – Allocation of limited resources
Medical Societies

• ASA Ethic Syllabus
• ACOG Committee on Ethics, Dec 2007 (reaffirm 2013)
• The Association of Anaesthetists of Great Britain and Ireland: *Management of Anaesthesia for Jehovah's Witnesses; 2nd ed, 2005*
  – Respect pregnant woman’s autonomy
  – Refrain from performing procedures unwanted by a pregnant woman
  – Right to withdraw care if cannot agree with pt
  – Informed consent
  – Alternative treatments
Jehovah’s Witnesses’ Stance on Blood Transfusion

- Blood is sacred
- Once blood leaves the body, it must be disposed of.
- Prohibit pre-operative donated autologous blood and transfusion of allogeneic blood
- Generally consent to techniques and procedures involving temporary diversion of autologous blood if no allogeneic blood prime is used (“continuous circuit”)
Jehovah's Witnesses' Basic Position on Blood

- Whole Blood
  - Red Cells
  - White Cells
  - Plasma
  - Platelets

Personal Decision
- Red Cell Fractions
  - Hemoglobin based blood substitutes
- White Cell Fractions
  - Interferons
  - Interleukins
- Plasma Fractions
  - Albumin
  - Globulins
  - Clotting factors
- Platelet Fractions
  - Wound healing factor

http://pennhealth.com/health_info/bloodless/blood_jchart.html
Jehovah’s Witness Parturients

- Ireland: University-affiliated tertiary referral center
  - Retrospective study: Jan 2007- Dec 2013
  - 76 JW parturients
    - 7.9%: accept major fractions (RBCs, Plasma, Platelets)
    - 50%: accept some minor fractions
    - 70.3% Nulliparous vs. 48.9% Multiparous accept some components
    - 70.5% with advance directives vs. 37.5% with none will accept some components
    - African women has lowest acceptance rate

Acceptable Alternatives

• **Volume expanders**
  – Crystalloids
    • Ringer’s Lactaid
    • Saline
  – Colloids
    • Dextran
    • Gelatin
    • Hetastarch (Hespan, Hextend)
    • Pentastarch
Acceptable Alternatives

- **Hematopoietic agents**
  - IV Iron (InFed, Ferrlicet, Venofer)
  - Folic Acid
  - Vitamin B-12
  - Vitamin C
  - Granulocyte-colony stimulating factor (Neupogen)
  - Interleukin-11 (Neumega)
  - Recombinant stem-cell factor (Stemgen)
Acceptable Alternatives

• Hemostatic agents for bleeding/clotting
  Topical
  – Avitene
  – Gelfoam
  – Oxygel
  – Surgicel
  – Recombinant thrombin (Recothrom)

• Injectable
  – Desmopressin (DDAVP)
  – e-aminocaproic acid (Amicar)
  – Tranexamic acid (Cyklokapron)
  – Vasopressin (Pitressin)
  – Vincristine (Oncovin)
  – Conjugated estrogens
  – Vitamin K (Phylo
  – Recombinant Factor VIIa (NiaStase)
  – Recombinant Factor IX (BeneFIX)
  – Erythropoiesis stimulating protein in polysorbate solution (Aranesp®)
Acceptable Alternatives

• Operative and anesthetic techniques
  – Hypotensive anesthesia (data from cardiac, neuro cases)
  – Induced hypothermia (data from cardiac, neuro cases)
  – Mechanical occlusion of bleeding vessel
  – Hyperbaric oxygen therapy
  – Perfluorocarbon solutions (not commercially avail)
  – Artificial blood
- Albumin
- Any drug buffered with albumin (e.g., Epogen/Procrit, Kogenate)
- Immune globulins
- Natural clotting factors
- Cryoprecipitate
- Plasma protein fractions (Plasmanate)
- Tissue adhesives
- Natural interferons
- Hemoglobin-based blood substitutes
- Platelet derived wound healing factors
Case Scenario

• More info:
  – 23 y.o. Jehovah’s Witness parturient, G₃P₂ with previous C/Sec X 2.
  – Now EGA 30wks
  – Ultrasound at 26 wks with placenta previa

• What is your course of action?
Background

- Obstetric hemorrhage is the second leading cause of maternal mortality in US
- For JW women with obstetric hemorrhage, there is an increased risk of death (Singla 2001, with 44-fold. Massiah 2007, with 65-fold)
- Varying degree of adherence to the doctrine of blood transfusion among Jehovah’s Witnesses

Preoperative Preparation

• Anesthetic preoperative evaluation
  – Informed consent
  – Explore and confirm acceptable strategies

• Increase erythropoiesis/red cell mass

• Anesthetic plans
  – Interventional radiology
  – Embolization catheter
  – Vascular balloons

• Rogers, DM, Crookston KP. Transfusion. Vol 46, 2006
ADVANCE MEDICAL DIRECTIVE/RELEASE

I, ____________, make this advance directive as a formal statement of my wishes. These instructions reflect my resolute decision.

I direct that no blood transfusions (whole blood, red cells, white cells, platelets, or blood plasma) be given to me under any circumstances, even if physicians deem such necessary to preserve my life or health. I will accept nonblood volume expanders (such as dextran, saline or Ringer's solution, or hetastarch) and other nonblood management.

This legal directive is an exercise of my right to accept or to refuse medical treatment in accord with my deeply held values and convictions. I am one of Jehovah’s Witnesses, and I make this directive out of obedience to commands in the Bible, such as: "Keep abstaining... from blood." (Acts 15:28, 29) This is, and has been, my unwavering religious stand for years. I am ____________ years old.

I also know that there are various dangers associated with blood transfusions. So I have decided to avoid such dangers and, instead, to accept whatever risks may seem to be involved in my choice of alternative nonblood management.

I release physicians, anesthesiologists, and hospitals and their personnel from liability for any damages that might be caused by my refusal of blood, despite their otherwise competent care.

I authorize the person(s) named on the reverse to see that my instructions set forth in this directive are upheld and to answer any questions about my absolute refusal of blood.

Signature

Address

Date

Telephone

Witness

Witness

Passed in U.S.A.
Preoperative Preparation

• Multidiscipline meeting prior to term
  – Pt
  – Family*
  – Church elder*
  – OB-Gyn, other surgical services
  – Anesthesia

• Possible hysterectomy

• Ideally: departmental guidelines, staff list of preferences

• Have a plan of action!
Preoperative Preparation

- Increase erythropoiesis/ red cell mass
  - Prenatal Vitamins
  - Iron
  - Folic acid
  - Erythropoietin if Hct < 40%
Erythropoietin

- Glycoprotein from kidney
- Stimulate RBCs production
- Recombinant from Chinese hamster ovary cells
- Epoetin alfa (Epogen®, Procrit®): contain 2.5mg/ml albumin
  - Dose: 50-300 U/Kg tid
- Darbepoetin alfa (Aranesp®): contains no blood fractions.
  - Dose: 100mcg/wk
- Average Hb 1.4g/wk
- Folate 1mg/day + Fe sulfate 300mg tid
Intraoperative Management

• Decrease RBCs loss
  – Pharmacologic
    • Antifibrinolytic
    • DDAVP
    • Factor VIIa
  – Mechanical
    • Cell savage
    • hemodilution

• Anesthetic manipulation
  • Controlled hypotension
  • Mild hypothermia

• Improve oxygen delivery
  – Perfluorocarbons
  – Hemoglobin preparations

• Mann, MC et al. Annals of Internal Medicine, 1992
• De Souza, A et al. BJOG, 2003
• Doyle, JD. Am J Ther, 2002
Antifibrinolytics

• Prevent activation of fibrinogen to fibrin
• Aprotinin
• Tranexamic acid
• Epsilon-aminocaproic acid

• Data derived from cardiac cases
DDAVP

• Release endogenous factor VIII and von Willebrand factor, tissue plasminogen activator from endothelium
• Enhances platelet adhesion to vessel wall
• Data from cardiac, spinal surgeries

Recombinant Factor VIIa

- Baby hamster kidney cells
- Activates extrinsic pathway
- Forms a tight fibrin hemostatic plug
- FDA approved for congenital Factor VII, deficiency, inhibiting antibodies to Factor VII and IX, hemophilia A, or B
- 50 – 100mcg/Kg at $1.65/mcg
- For 70Kg, ~ $10,000

Recombinant Factor VIIa

- Data from 9 European countries (2000-2004)
- Use of recombinant Factor VIIa (rFVIIa) in postpartum hemorrhage
- 128 women received rFVIIa, 113 avail data
- 97/113 (86%) “treatment”: standard treatments failed, rFVIIa given as “heroic measure”
- 16/113 (14%) “secondary prophylaxis”: rFVIIa used to support other successful interventions
- 80% improvement in both groups
- 4 cases of thromboembolism, 1 MI, 1 skin rash

Alfirevic z et al. Obstet Gynecol. 2007 Dec;110(6):1270-8
Recombinant Thrombin (factor IIa)

- Recothrom® (ZymoGenetics, Inc.)
- Recombinant DNA technology from Chinese Hamster Ovary cells
- Approved by FDA January 2008
- Topical use only
- Aid to hemostasis whenever oozing blood and minor bleeding from small blood vessels
- $86/vial
Cell Salvage

- Anticipated EBL > 400-500 ml
- Blood is collected from surgical field, washed, reinfussed; can be “closed circuit”
- Leukocyte reduction filter ↓ fetal squames lamellar bodies
- No cases of adverse events in 174 women with cell salvage during C/sec. De Souza, et al. BJOG 2003
- “Considered in placenta acreta” ACOG practice Bulletin, oct 2006
Acute Normovolemic Hemodilution (ANH)

- \( V = EBV \times (Hct_i - Hct_f) / Hct_{av} \)
  - \( V \) = Blood volume removed
  - \( EBV = 90\text{ml/kg} \) (term)
  - \( Hct_i = \text{pt’s Hct} \)
  - \( Hct_f = \text{minimum Hct tolerated} \)
  - \( Hct_{av} = \text{average Hct} \) \((Hct_i - Hct_f / 2)\)

- More effective if \( \geq 1000 \text{ ml blood withdrawal} \)
- Or anticipated EBL \( \geq 1500\text{ml} \) or 30% EBV
- Replace with crystalloid(3:1), or colloid (1:1)
Acute Normovolemic Hemodilution (ANH)

• Advantages
  – Autologous volume red cells lost during surgery
  – Source of fresh plasma, platelet at end of case
  – Reduction in blood viscosity
  – Increased in cardiac output
  – Improved microcirculatory flow
  – Closed circuit
Acute Normovolemic Hemodilution (ANH)

- Successfully used in pregnant population
    - 38 parturients
    - Case report
ANH performed prior to c/sec with cell saver in OR
Anesthetic Manipulations

- Controlled hypotensive anesthesia
  - Normotensive, healthy pts
  - Keep MAP 50 - 65 mmHg (cerebral perfusion)
  - blood loss
  - Adequate ventilation to maintain normocarbia

- Hypothermia
  - $O_2$ consumption $\downarrow$ 7% per 1°C drop
  - Goal: Core temp 30-32 °C
  - Use of neuromuscular blocking agents, ventilatory support to $\downarrow$ shivering
  - Usu. With hemodilution to offset $\uparrow$ blood viscosity
Figure 2. A suggested algorithmic perioperative approach to care of the Jehovah’s Witness parturient preparing to undergo an operative procedure.

Meticulous Surgical Technique to Minimize Blood Loss
- An experienced surgeon
- Use of hemostatic surgical devices (electrocautery, argon-beam coagulation)
- Physical occlusion of bleeding vessels
- Minimally invasive approaches
- Early consideration for cesarean hysterectomy

Blood Conservation Techniques
- Cell salvage
- Acute normovolemic hemodilution
  (*Maintain a closed circuit continuous flow system.)

Use of Pharmacologic Agents
- Uterotonics (oxytocin, carboprost tromethamine, methylergonovine, misoprostol)
- Desmopressin
- Tranexamic acid
- Recombinant factor VIIa
- Prothrombin complex
- Topical hemostatic agents

Postoperative Management
- Consider intensive care unit admission for continuous monitoring and assessment
- Delivery of supplemental oxygen to maximize tissue oxygen delivery
- Fluid resuscitation with crystalloid and/or colloid volume expanders
- Avoidance of hypotension and hypothermia
- Limited phlebotomy
- If therapy for postdural puncture headache is required, perform epidural blood patch using a continuous closed circuit technique

Caring for the Jehovah’s Witness Parturient.
-Mason, C; Tran, Connie
-DOI: 10.1213/ANE.0000000000000933
Blood Substitutes ??

• Ideal blood substitute: lack antigenicity, eliminate, or at least substantially reduce, the ability to transmit infections, readily available, a long half-life, stored at room temperature, reasonable amount of oxygen delivery, when compared to normal human red blood cells.

• None has been approved by FDA or commercially available in the USA for humans.

Blood Substitute: Perfluorocarbons

- chemically inert, thermally stable and non-toxic, non-flammable, small compound
- Emulsified in water and salt
- High solubility coefficient for oxygen so can dissolve large amount of O$_2$ and CO$_2$
- Load/unload O$_2$ 2X faster than Hgb
- Synthetic: universally compatible
- Long shelf life (2 yrs), no refrigeration

Blood Substitute: Perfluorocarbons

Clark and Gollan, 1966

Mice submerged in liquid fluorocarbon can breath in the liquid for several hrs

Fluosol-DA 20 (first generation PFCs)

FDA approved in 1989; discontinued in 1994 due to increased incidence of stroke, acute complement activation and disruption of pulmonary surfactant,

Blood Substitute: Perfluorocarbons

- Second generation perfluorocarbons
  - Enhanced oxygen carrying capacity (1 unit = 1-2 units of PRBCs)
  - More stable
  - Oxygent®, Oxyfluor®: emulsified in triglyceride and egg yolk lecithin
  - Oxygent® phase III European trials (492 pts): study pts required fewer or avoid blood transfusion.
  - Oxygent® was undergoing phase III study trial in US but halted for high stroke rate in both groups
  - Side effects: flu-like symptoms, mild in platelets (10-20%)
  - Studies began in China in 2007

http://www.allp.com/Oxygent/ox_fact.htm
Blood Substitute: HBOC

- Hemoglobin-base oxygen carriers (HBOC)
- Extracted from outdated human blood (Polyheme®, Hemolink®)
- Chemically stabilized bovine Hgb (Hemopure®) approved for human use in South Africa and Russia
- Long shelf life (>12 months)
- No refrigeration
- Phase IIa / III clinical trials


- [https://www.inglewoodhospital.com/pdf/CRC-Research%20Developments-Vol-1-Fall%202013.pdf](https://www.inglewoodhospital.com/pdf/CRC-Research%20Developments-Vol-1-Fall%202013.pdf), access 1/28/15
Case Scenario: It’s Not Over Yet…

• 23 y.o. Jehovah’s Witness parturient, G₃ now P₃; s/p CSE anesthesia for repeat c/sec

• C/O post dural puncture headache on POD#2
Epidural Blood Patch in Jehovah Witnesses

- Multiple case reports
- Acceptable
- Closed continuous circuits
- Consider colloid (Dextran 40) epidural patch


Narasimhan and Tetzlaff. Can J Anes. 2005
Case Scenario

- Pt agreed to a closed circuit epidural blood patch
- Pt’s headache resolved
- Discharged home
- Eternal salvation is possible

www.watchtowerinformationservice.org/icon2.jpg
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