

# Surgery in Jehovah's Witnesses – our experience

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## Abstract

**Introduction:** Surgeons face a special challenge in treating Jehovah's Witnesses who refuse blood transfusion.

**Aim:** To present our surgical experience with this group of patients operated on in our department.

**Material and methods:** A retrospective study of 16 unselected Jehovah's Witnesses patients was conducted between October 2004 and February 2012. We analysed gender, age, haemogram before and after surgery, types of surgery, postoperative complications and the need for blood transfusion, and/or other drugs stimulating erythropoiesis.

**Results:** Eighty-one percent of patients were women; the average age of all patients was 57.3 years. Mean haemoglobin level, preoperative, postoperative, and on the day of discharge from hospital, was 12.5 g/dl, 9.7 g/dl, and 9.29 g/dl, respectively. Over the same time period, mean red blood cell count was 4.53 mln/ $\mu$ l, 3.58 mln/ $\mu$ l, and 3.37 mln/ $\mu$ l, respectively. Two out of 16 patients agreed to have blood transfusion. Drugs used for erythropoiesis stimulation included rEPO, ferrum, and folic acid. No surgical death was noted.

**Conclusions:** We found that abdominal surgery was safe in our small group of Jehovah's Witness patients. However, all Jehovah's Witness patients should be fully informed about the type of procedure and possible consequences of blood transfusion refusal. Two of our patients agreed to blood transfusion in the face of risk of death.

## Introduction

The Jehovah's Witness religion is a Christian movement, distinct from mainstream Christianity, founded in the US in 1872 by Charles Russell, with over 6 million members worldwide (125,000–150,000 in the UK). Members of this faith have strong beliefs based upon passages from the Bible that are interpreted as prohibiting the "consumption" of blood. Their beliefs prevent them from accepting transfusion of whole blood or its primary components. The refusal of blood products is a core value of the faith, and transfusion without consent would be regarded by members as a gross physical violation. Thus, members of this religious group refuse the administration of blood, blood substitutes, and blood transfusions under any circumstances [1–3]. They also believe that blood that has been removed from the body is "unclean" and should be disposed of. The use of procedures that involve the removal and storage of their own blood are often unacceptable. Thus, the anaesthetic and surgical team faces a special challenge in treating Jehovah's Witnesses during blood-free major surgery. The problems associated with their management high-

lights a growing health-care issue – the supply, safety, and appropriate use of blood products [1, 4, 5]. There are over half a million Jehovah's Witnesses in the United States, who do not accept blood transfusions. Moreover, the number of Jehovah's Witnesses and those associated with them is increasing. Members of this faith have deep religious convictions against accepting homologous or autologous whole blood, packed red blood cells (RBCs), white blood cells (WBCs), or platelets and plasma. Medical staff need not be concerned about liability because Jehovah's Witnesses will take adequate legal steps to relieve liability as to their informed refusal of blood. They accept non-blood replacement fluids. Using these and other meticulous techniques, physicians are performing major surgery of all types on adult Jehovah's Witness patients, including cardiac surgery. Hans *et al.* think that a patient's status as a Jehovah's Witness need not preclude potentially life-saving cardiac operations [5–7]. Transfusion-free cardiac surgery is also performed in Jehovah's Witnesses' neonates [8, 9]. Some surgeons have declined to treat Jehovah's Witnesses because their stand on the use of blood products seemed to "tie

**Table I.** Patients' characteristics

Parameter	Results
Male/female, <i>n</i> (%)	3 (19)/13 (81)
Age, mean (range) [years]	57.3 (26–78)
ASA grade, <i>n</i> :	
I	3
II	7
III	6
Haemogram:	
On the day of admission:	
Haemoglobin, mean (range) [g/dl]	12.5 (9.5–14.8)
Haematocrit, mean (range) [%]	36.21 (31–44)
Red blood cell count, mean (range) [mln/ $\mu$ l]	4.53 (3.63–4.97)
On the first postoperative day:	
Haemoglobin, mean (range) [g/dl]	9.7 (6.5–14.2)
Haematocrit, mean (range) [%]	30.18 (12.9–43)
Red blood cell count, mean (range) [mln/ $\mu$ l]	3.58 (1.55–4.95)
On discharge from hospital:	
Haemoglobin, mean (range) [g/dl]	9.29 (6–13.6)
Haematocrit, mean (range) [%]	29.14 (20.7–36.8)
Red blood cell count, mean (range) [mln/ $\mu$ l]	3.37 (2.15–4.25)
Primary disease, <i>n</i> :	
Ascending colon cancer	1
Rectal cancer	4
Rectovaginal fistula	1
Haemorrhoids	1
Sigmoid cancer	2
Crohn's disease	1
Ulcerative colitis	2
Chronic gallstones cholecystitis	2
Colonic inertia	1
Postoperative abdominal hernia	1
Blood transfusion, <i>n</i>	2
Medical treatment of anaemia, <i>n</i> :	
Ferrum and folic acid	4
rEPO, ferrum and folic acid	2
rEPO	2
rEPO, ferrum, folic acid and haemostatic drugs	2

the doctor's hands", although many physicians have chosen to view the situation as only one more complication challenging their skills [6].

## Aim

In this study we aimed to present our modest surgical experience with Jehovah's Witness patients operated on in our department.

## Material and methods

We conducted a retrospective study from October 2004 to February 2012 and analysed 16 patients who were Jehovah's Witnesses treated at the Department of General and Colorectal Surgery, Medical University of Lodz. The collected data included the gender and the age of our patients, haematocrit, haemoglobin, and red blood cell values before and after operation, types of surgery, postoperative complications and the need for blood transfusion, and/or any other drugs stimulating erythropoiesis. Before surgery, all patients were fully informed about the type of procedure and the possible risks with the potential need for blood transfusion and the consequences of its refusal. The added risk of blood refusal, particularly during major surgery, was considered and discussed with the patients. Even after knowing all the risk, our patients expressed that they would carry on with the surgery without blood administration. All patients signed a medical directive of blood transfusion refusal to absolve all medical staff from any liabilities.

## Results

During the study period we treated 16 unselected adult Jehovah's Witnesses patients. Of the 16 patients, 13 (81%) were women and 3 (19%) were men. The average age of patients was 57.3 (range: 26–78) years. Mean preoperative haemogram revealed haemoglobin and haematocrit levels of 12.5 g/dl and 36.21% (range: Hgb 9.5–14.8; Hct 31–44), respectively, and a red blood cell count of 4.53 mln/ $\mu$ l (range: 3.63–4.97). Mean postoperative (within 24 h after surgery) haemogram revealed haemoglobin and haematocrit levels of 9.7 g/dl and 30.18% (range: Hgb 6.5–14.2; Hct 12.9–43), respectively, and a red blood cell count of 3.58 mln/ $\mu$ l (range: 1.55–4.95). Mean haemogram on the day of discharge from the hospital showed haemoglobin and haematocrit levels of 9.29 g/dl and 29.14% (range: Hgb 6–13.6; Hct 20.7–36.8), respectively, and a red blood cell count of 3.37 mln/ $\mu$ l (range: 2.15–4.25). In 3 patients, in whom minor surgery was performed (haemorrhoidectomy, *n* = 1; laparoscopic cholecystectomy, *n* = 2), laboratory tests were done only preoperatively. A summary of patients' characteristics is noted in Table I.

There were 7 cases of colorectal cancer, 2 cases of gallstones, 2 cases of ulcerative colitis, and 1 case of each of the following diseases: rectovaginal fistula, haemorrhoids, Crohn's disease, colonic inertia, and postoperative abdominal hernia. The operative procedures and postoperative complications are shown in Table II. During surgery we paid a special attention to meticulous and rapid haemostasis to avoid excessive blood loss. Wound infection appeared in 2 patients after Hartmann's procedure (both presented ASA III). In one of these 2 patients small bowel resection with primary anastomosis was also performed. One patient, after Hartmann's procedure, developed postoperative obstruction that was successfully treated conservatively. Intra-abdominal haemorrhage appeared in 2 patients, and bleeding occurred after proctectomy with ileoanal pouch anastomosis and also after subtotal colectomy with ileorectal anastomosis. Both patients were reoperated on and bleeding vessels were ligated. The first of these 2 patients, in whom laboratory test revealed haemoglobin level of 2.4 g/dl and a RBC count of 0.94 mln/ $\mu$ l, agreed to have blood transfusion, and was also treated with rEPO, ferrum, folic acid, and antihaemorrhagic drugs (vitamin K, cyclonamine). The second patient who bled postoperatively (blood test showed Hgb 6.5 g/dl, RBC 2.55 mln/ $\mu$ l) was administered rEPO, ferrum, folic acid, and haemostatic drugs (vitamin K, cyclonamine). Another patient after Hartmann's procedure, who had haemoglobin level of 6.6 g/dl and a RBC count of 2.2 mln/ $\mu$ l postoperatively, finally agreed to have blood administration. Thus, 2 patients withdrew their refusal of blood transfusion. In total, except for the 2 mentioned patients who were reoperated on due to intra-abdominal bleeding, 2 patients received rEPO, 4 patients were treated with ferrum and folic acid, and 2 patients received rEPO, folic acid, and ferrum because of anaemia in the postoperative period.

No surgical death was observed.

## Discussion

Understandably, caring for Jehovah's Witnesses might seem to pose both ethical and moral dilemmas for a physician dedicated to preserving life and health by employing all the techniques at his/her disposal [6, 10, 11]. Editorially prefacing a series of articles about major surgery on Witnesses, Harvey admitted to being annoyed by those beliefs that might interfere with his work. But he also added that surgeons too easily forgot that surgery "is a craft" dependent upon the personal technique of individuals, thus that technique could be improved [6, 10]. Bolooki pointed out that most surgical procedures in that group of patients were associated with less risk than usual. He stated that although the

**Table II.** Operative procedures and postoperative complications

Parameter	Results
Type of surgery:	
Right hemicolectomy	1
Hartmann's procedure (sigmoid/rectal resection)	2
Subtotal colectomy with ileorectal anastomosis	2
Hartmann's procedure (sigmoid resection) and small bowel resection with anastomosis	1
Sigmoid resection	1
Milligan-Morgan haemorrhoidectomy	1
Postoperative hernia repair	1
Laparoscopic cholecystectomy	2
Abdominoperineal resection	1
Closure of a sigmoid loop colostomy	1
Abdominoperineal resection and small bowel resection with anastomosis	1
Anterior resection of rectum with panhysterectomy	1
Proctectomy with ileoanal pouch anastomosis	1
Postoperative complications:	
Wound infection	2
Postoperative obstruction	1
Intra-abdominal haemorrhage	2

surgeons might feel that they were deprived of an instrument of modern medicine, he was convinced that by operating on these patients surgeons would learn a great deal [6, 12].

In 1977, Ott and Cooley reported on 542 cardiovascular operations performed on Jehovah's Witnesses without blood transfusion and concluded that this procedure could be done "with acceptably low risk". He also did a statistical review of 1,026 operations and determined that the risk of surgery in patients of the Jehovah's Witness group was not substantially higher than for others [6, 13]. Similarly, DeBakey communicated that in the vast majority of situations involving Witnesses, the risk of operation without the use of blood transfusions was no greater than in those patients on whom he used blood transfusions [6]. Jassar *et al.* developed a comprehensive multimodality programme for Jehovah's Witness patients and obtained excellent results in cardiac surgery. Based on their 10-year experience, they reported that bloodless cardiac surgery in Jehovah's Witness patients could be performed with ex-

cellent outcomes in both elective and urgent situations. Major complication rates were not significantly different between the elective group and the urgent group [14]. Similarly, Vaislic *et al.* reported their 21-year experience in cardiac surgery based on 500 Jehovah's Witness patients and concluded that cardiac surgery without transfusion in high-risk Jehovah's Witnesses patients could be carried out with results equivalent to those of low-risk patients thanks to recent advances in surgical techniques and blood conservation protocols [15].

Although formerly, many physicians and hospital officials viewed refusal of a transfusion as a legal problem and sought court authorisation to proceed as they believed was medically advisable, recent medical literature reveals that a notable change in attitude is occurring. This may be a result of more surgical experience with patients having very low haemoglobin levels and may also reflect increased awareness of the legal principle of informed consent. Nowadays, a large number of elective surgical and trauma cases involving Jehovah's Witnesses are being performed without blood transfusions. In elective surgery this should rarely be an issue, providing decisions have been made clearly in advance. Since Witnesses do not object to colloid or crystalloid replacement fluids, electrocautery, hypotensive anaesthesia, or hypothermia, these have all been employed successfully. Current and future application of starch, large-dose intravenous iron dextran injections, and the "sonic scalpel" are promising and not religiously objectionable. Moreover, over the years, representatives of Jehovah's Witnesses have met with surgical and administrative personnel in hospitals to avoid medical/legal confrontations. Witnesses are deeply religious people who believe that blood transfusion is forbidden for them by the Bible (certain passages in the Old Testament), and receiving blood products may lead to excommunication from their community and fear of eternal damnation as well as to social isolation by their own family members, relatives, and friends. Beliefs regarding blood products originate from distinctive interpretations of specific passages from the Bible (*New English Bible*, Genesis Ch. 9: v.3-4; Leviticus 17: 10-14; Acts Ch. 15: v.19-21; "you must not eat the flesh with the life, which is the blood still in it", "not eat from the bread of life", "Christians must abstain from... fornication and from what is strangled and from blood"). One of the fundamental beliefs is that blood transfusion is equated with the "eating of blood" and if blood is transfused, it could lead to elimination of any hope for eternal life. Although biblical verses are not stated in medical terms, they view them as ruling out transfusion of blood. However, Witnesses' religious understanding does not absolutely prohibit the use of components such as albumin, immunoglob-

ulins, vaccines, and haemophilic preparations (clotting factors), each Witness must decide individually if they can accept these products. Thus, when referring to the use of such "fractions" of blood components, Jehovah's Witnesses are encouraged to reach their own conscientious decisions. The Witnesses do not feel that the Bible comments on organ transplants, hence, decisions regarding cornea, kidney, or other tissue transplants must be made by the individual Witness [3, 5, 6]. However, it was estimated that the Watchtower (the church group headquarters overseeing Jehovah's Witnesses) imposes disfellowships on some 40,000 members or approximately 1% of its memberships annually. The disfellowship is permanent, unless members show very strong repentance for months or years [5].

In 1981, MacEwen and Bowen said "the surgeon needs to establish the philosophy of respect for a patient's right to refuse a blood transfusion but still perform surgical procedures in a manner that allows safety to the patient" [6].

Respect for patient's autonomy and human rights requires procurement of informed consent before any medical intervention [1, 16]. The absolute refusal of blood transfusion by a Jehovah's Witness may be at odds with a doctor's personal beliefs and desire to preserve life. Legally, it is clear that a health professional may not override a valid and applicable advance refusal of treatment. A mentally competent individual has an absolute right to refuse consent for medical treatment, for any reason, even when this may lead to his or her own death. The doctor's basic legal and ethical responsibilities towards the patient are unchanged, and to proceed with the administration of blood to a patient who has steadfastly refused to accept it is considered a serious personal violation. Such actions are unlawful. Jehovah's Witnesses are generally well informed of their rights, options of treatment, and the consequences of refusal of blood transfusion. They may wish to discuss aspects of treatment with Elders of the Witness community or consult the Jehovah's Witness Hospital Liaison Committee [1]. In recent years, some Witness patients have accepted the use of haemoglobin-based oxygen carriers without offending either conscience or community, although many Jehovah's Witnesses may refuse such novel medications. Therefore, each patient's individual needs, values, and beliefs must be assessed, acknowledged, and respected. Specific treatments should be carefully discussed with the patient and family in order to clarify exactly what is acceptable [3]. In Poland, Jehovah's Witnesses present and sign their Advance Medical Directive on the day of admission to hospital. There is also a Jehovah's Witness Liaison Committee. The Advance Directive excludes transfusion of

blood and primary blood components, and releases all medical staff from any liability for any consequences resulting from refusal of blood. On the other hand, a legal representative is mentioned in such documents to represent Witnesses in various legal matters but not blood transfusion. Thus, the legal situation is not fully clear.

In an emergency, when a patient's Jehovah's Witness status is unknown, the doctor caring for the patient is expected to perform to the best of their ability, which may include the administration of blood. Relatives or friends who suggest that a patient would not accept blood transfusion must be asked to provide documentary evidence, such as an advance directive. Without this, blood should not be withheld in life-threatening circumstances. If the patient is a Jehovah's Witness, the doctor caring for them is obliged to provide care while respecting the patient's competently expressed views, even if this means they will die for lack of blood transfusion. If at any time refusal of consent is retracted, a contemporaneous witnessed entry should be made in the patient's notes [1]. We need to remember that in cases of certain medical emergencies when so-called "bloodless medicine" is not available, blood transfusions may seem to be the only available way to save a life. The Watch Tower Society has acknowledged that some members have died after refusing blood [17, 18].

In certain cases, some patients might carry a "blood card", a sort of advance directive brought along by the Jehovah's Witnesses to indicate their informed refusal of blood in the event of emergency. However, there have been doubts about the validity of such cards, since it is sometimes unclear whether the patients were adequately and objectively informed about the benefits and risks of blood transfusion when they signed such cards, or if they were under obligation to comply with their conviction as Jehovah's Witnesses due to coerciveness and peer pressure from the religion. In cases of uncertainty, when patients are unconscious and mentally incompetent to make any decision, it is always the best practice for the doctors to seek guidance from the hospital's ethics committee or the legal advisors, or to make an urgent *ex parte* application to the courts for the appropriate action to be taken. On the other hand, in emergencies where no "blood card" is present and when there is insufficient time for any discussion and/or no discussion is available, then the doctors should administer blood as early as possible to preserve the patient's life or health in his/her best interest and in accordance with responsible medical practice [5]. The refusal of blood products may conflict with medical responsibilities for preserving life. A difficult situation would be the management of an unconscious Jehovah's Witness patient with severe haemorrhage. In these

circumstances, the doctor should search for clear evidence, such as an advance directive, stating that the patient would not accept blood products, even with life-threatening bleeding. In the absence of such evidence, the doctor should act in what he or she sees as the best interests of the patient with or without the use of blood [3]. In the postoperative period, due to severe anaemia and life-threatening condition, 2 out of 16 patients withdrew their refusal of blood administration and were transfused. One should also realise that some surgical procedures, mainly those performed within the pelvis, run a higher risk of haemorrhage. Therefore, such patients should be treated at high-volume centres by experienced surgeons. Despite the fact that our patients were operated on by senior staff and that haemostasis was obtained intraoperatively, 2 patients bled in the early postoperative period. In the first patient, in whom subtotal colectomy with ileorectal anastomosis was performed, we used a modern vessel sealing device instead of the typical tying that turned out to be insufficient. During second surgery we found that some blood vessels needed to be ligated. The second patient bled after proctectomy with ileoanal pouch anastomosis, and, as we mentioned, surgery within this region carries a higher risk of haemorrhage. Bleeding vessels were successfully ligated during subsequent laparotomy.

Elective surgery for Jehovah's Witness patients should be conducted by a senior team sensitive to the patient's beliefs and with experience in techniques of "bloodless surgery". An anaesthetist may refuse to anaesthetise an individual in an elective situation, but attempts should be made to refer the patient to a suitably qualified colleague prepared to accept the limitations imposed. In the US, there are a growing number of "bloodless surgery centres". Their work has been driven by the requirement to reduce the use of blood transfusion for scientific, economic, and religious reasons. Experience in techniques aimed at reducing blood transfusion is growing in the UK. Jehovah's Witness patients requiring major surgery should be referred to centres with appropriate experience [1, 4]. One should also admit that generally greater awareness amongst surgeons of transfusion risks and escalating costs (around £100 per unit of red blood cells) has resulted in a recent increase in the popularity of transfusion avoidance strategies, often termed "bloodless surgery" [3]. If surgeons and other members of the surgical team, the anaesthesiology department, the nursing service, and hospital administrators understand the medical restraints of this religious doctrine and the resultant legal, moral, and physiologic consequences, they can more effectively implement alternative methods of therapy [2]. Before surgery, there was full and clear discussion between

physicians and our patients, all risks were explained, and consent forms were signed by all Witnesses. The patient's haemoglobin levels should be optimised (at least 10 g/dl), and bleeding and clotting times checked and normalised. Any drugs with an effect on coagulation should also be discontinued before surgery. Anaesthetists and theatre staff were also informed before surgery, so that any specialist drugs and equipment could be made available (e.g. iron, folate, B<sub>12</sub>, erythropoietin, vitamin K, biological haemostats, argon beam diathermy, spray coagulation) [1–3, 5]. Before elective surgery, 2 patients were treated with rEPO and ferrum due to anaemia. Erythropoietin is a hormone produced primarily by the kidney. Hypoxaemia stimulates its production, resulting in erythropoiesis. Recombinant EPO has been used for 30 years in anaemic patients undergoing renal dialysis, and it is now approved for use in autologous blood donation and to reduce transfusion requirements in patients undergoing major surgery. rEPO may be an effective alternative to blood transfusion in patients undergoing major surgery and is recommended in patients if their clinical condition permits sufficient time for rEPO to promote erythropoiesis (~4 weeks). Erythropoiesis is seen in 3 days, the equivalent of one unit of blood is produced in 7 days, and five units are produced in 28 days. Iron supplementation is recommended in all patients undergoing rEPO therapy [1, 19].

Preoperatively, some steps should be taken to minimise the risk factors associated with transfusions, such as discontinuing anticoagulation therapy, administering antifibrinolytic therapy, and correcting preoperative anaemia [20]. There is also a need to be aware that there are ways to correct anaemia or raise the haemoglobin level by means other than transfusion, and in a timely manner prior to becoming ill and requiring hospitalisation or surgery. A sensible approach would include the early detection and evaluation of anaemia, through basic tests and attempts at correction. In two-thirds of older adults with anaemia, a cause is readily discernible and a diagnosis can be made utilising basic blood tests. In addition to haemoglobin, haematocrit, white cell, and platelet counts, one must obtain tests for kidney, hepatic, and thyroid function, and status of iron (ferritin and transferrin saturation), folic acid, and vitamin B<sub>12</sub> stores. Chronic kidney disease is known to be one of the most significant causes of anaemia. Impaired renal function is common in older adults, and anaemia becomes increasingly frequent. Anaemia of renal origin responds to erythropoietin stimulating agents coupled with iron supplements. In the management of anaemia in the preoperative period, one must attempt to find a means to bridge the time gap until the patient's bone marrow

can recover to produce acceptable haemoglobin levels (administration of iron, folate, or B<sub>12</sub>). All attempts should be directed to promote erythropoiesis and improve oxygenation [21]. Several new procedures have emerged to address the medical needs of Jehovah's Witnesses, including stimulation of blood component production by agents such as EPO, limited phlebotomy, hormonal suppression of menstrual cycles, or cell-saver auto transfusion [22]. The most prominent challenge of intraoperative management of Jehovah's Witness patients is minimising blood loss. Surgeons can reduce blood loss by direct control of bleeding sources, using of haemostatic devices such as electrocautery and ultrasonic scalpel, infiltration of the surgical wound with local vasoconstrictors, and application of topical haemostatics such as fibrin glue or thrombin gel. Moreover, patient positioning, such as elevation of the surgical site, and tourniquets can have profound effects on the rate of bleeding. During the immediate postoperative period non invasive techniques include close surveillance for bleeding, adequate oxygenation, and restricted phlebotomy. Pharmacological methods include the administration of haemostatic agents to stop bleeding, erythropoietic agents to promote RBC production, antihypertensives to reduce re-bleeding associated with hypertension, and the conservative use of anticoagulants and antiplatelet agents. And what is more, maintaining normovolaemia with crystalloid or colloid solutions in the face of anaemia is crucial to maintaining adequate tissue perfusion [20].

Many Jehovah's Witnesses carry a clear "advance directive" prohibiting blood transfusion. Despite the fact that Jehovah's Witnesses readily sign the documents relieving physicians and hospitals of liabilities that are binding on the patient and offer protection to physicians, and most Witnesses carry a dated, witnessed Medical Alert card prepared in consultation with medical and legal authorities [1, 6], the question with no clear answer still arises if anybody has the right to place a surgeon in such a difficult moral situation. What about their beliefs and potential guilty conscience? Who will soothe and "cure" their remorse when being aware of the real possibility of saving someone's life, while being unable to because their hands were tied. Is it a sort of legal euthanasia? Many surgeons refrain from operating on Jehovah's Witnesses due to fear of legal consequences and being inconsistent with their beliefs.

The traditional haemoglobin concentration at which blood transfusion is necessary has been challenged by a number of studies. In young healthy volunteers, oxygen delivery is not compromised even when the haemoglobin concentration is 5 g/dl. In the elderly, mortality is not increased if haemoglobin concentrations are kept

above 8 g/dl, and this concentration is also considered sufficient in patients with severe cardiorespiratory disease. A large, randomised controlled trial of intensive-care patients showed no detriment in restricting transfusion at haemoglobin concentrations of 7–9 g/dl, compared with a liberal transfusion policy. Wound healing is not affected unless oxygen tension decreases to less than 6.5 kPa or haematocrit is less than 18%. In light of these findings, transfusion to achieve a specific haemoglobin concentration (often 10 g/dl) has been questioned in view of the risks associated with allogenic blood transfusion. Moreover, invasive monitoring allows optimisation of tissue oxygen delivery, which is dependent upon many more factors than haemoglobin concentration alone. These factors may be manipulated by the anaesthetist (e.g. cardiac output, oxygen saturation) to enable tissue oxygen delivery [1]. Two of our patients who finally accepted blood transfusion had haemoglobin level of 2.4 g/dl and 6.6 g/dl, respectively. In total, due to postoperative anaemia, 10 out of 16 patients were treated with a different combination of the following drugs: rEPO, ferrum, folic acid, and haemostatic drugs. When preoperative Hgb values are taken into account, we also need to remember that postoperative Hgb levels are likely to be lower due to aggressive fluid replacement and subsequent haemodilution.

Nowadays, an increasing number of physicians, rather than consider the Witnesses patient as a problem, accept the situation as a medical challenge. This group of patients generally manifests unusual appreciation for the care they receive and gladly cooperate with physicians and medical staff facing this unique demanding situation [6].

However, the question still remains as to what extent doctors may and should accept a patient's decision and agree to perform major surgery without the possibility of potential blood transfusion if it is against the rules of standard medical care and is not in line with the dictates of their conscience and beliefs. On the other hand, who has the right not to give the physician a choice and make him/her risk the patient's life as well as expose him to criticism and pangs of remorse? Chua *et al.* mention in their paper that it is also the right of the doctors not to engage in what they consider as a compromise on the standards of care without blood. Many healthcare institutions have policies that allow such practices. The ultimate decision on whether to treat the patients should thus rest with the doctors. The major dilemmas faced by the doctors would be to assess carefully the medical indications for surgery, surgical technique to reduce blood loss, and the risk of bleeding and its associated complications in relation to the absence of blood replacement. If the doctors ul-

timately feel that the refusal to accept a blood transfusion would make the procedure harder and do not wish to take any risks of surgery without the blood transfusion, after weighing the benefits of the procedure to cure the patient's primary condition, they should not be compelled to perform the procedure against their conscience and should have the right to be a conscientious objector (similar to other ethically-problematic medical procedures, such as termination of pregnancy and fertility treatment) [5].

It is essential that the healthcare professionals respect the autonomy and decisions made by Jehovah's Witnesses, even though it may not be in their best interests, in the doctors' professional opinion. On the other hand, from the patients' perspective, it would seem to be in their best interests, with regard to respecting their spirituality and religious beliefs. Perhaps, it would be best to recommend that individual hospitals and professional bodies set clear internal policies and management protocols on dealing with Jehovah's Witnesses, as well as draw up a list of Jehovah's Witness-friendly doctors who are readily accessible when Jehovah's Witnesses are referred to or admitted into the hospital [5]. A good reference for the hospitals in setting their internal policies and protocols is the *Code of Practice for the Surgical Management of Jehovah Witnesses* published in 2002 by the Council of the Royal College of Surgeons of England. According to Chua and Tham, such policies and guidelines will allow for consistency and good medical practice, whenever any doctors encounter Jehovah's Witnesses in their medical practice and hence prevent any medical, ethical, or legal dilemmas which may ensue [5].

Gardner *et al.* observed: "Who would benefit if the patient's corporal malady is cured but the spiritual life with God, as he sees it, is compromised, which leads to a life that is meaningless and perhaps worse than death itself" [6, 23]. On the other hand, the ethical, moral, legal, and medical concerns between physicians and Jehovah's Witnesses in terms of respecting the patient's autonomy and compromising standards of care requiring blood transfusion will always exist, particularly in life-threatening conditions, when such refusal of standard therapy could result in adverse outcomes, such as death [5]. Finally, Jehovah's Witnesses are not the only group of patients that refuse blood products. Increased awareness of the risks of transfusion, including communicable diseases such as HIV, has resulted in a greater number of patients not accepting blood for non-religious reasons. The surgical team should, therefore, be familiar with the risks of blood transfusion, and be prepared to communicate these to the patient [3].

## Conclusions

We found that abdominal surgeries in our small group of Jehovah's Witnesses patients were safe. However, two of our female patients agreed to blood transfusion in a "life or death" situation after serious discussion with them. The first woman was a middle-aged mother and the second older female patient underwent major abdominal surgery and developed postoperative complications.

## Conflict of interest

The authors declare no conflict of interest.

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