

The Desire for the Practice of Bloodless Surgery Among Our Patients.

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ABSTRACT

Although blood ordering is a common practice in surgical field, the average requirement for a particular procedure is usually based on the subjective anticipation of blood loss rather than on evidence based estimates. It is known that over-ordering, even with minimal utilization, squanders technical time, reagent and imposes extra expenses on patients [1]. There are also known infective possibilities in any patient who get a transfusion. Therefore a human right to refuse the above transfusion on religious believes or otherwise must be understood and respected. Despite all the above issues ,the demand for surgery remains an issue that many a patient needs it to survive and therefore must be performed but without blood transfusion. This is the challenge that we as Surgeons must as much as possible perform a bloodless operation.

Key words: Bloodless, Patients, Surgery, Transfusion.

INTRODUCTION

It is clear to patients and surgeons that the demand for bloodless surgery is increasing.

Hence the dealing on how to approach major surgery where patients refuse blood transfusion (this includes Jehovah's Witnesses) must be positively handled.

It is known that the request for this type of surgery i.e. bloodless surgery, has traditionally been made for religious reasons and of course the religious reason is mainly the Jehovah's Witness (JW) problem. Jehovah's Witnesses do not permit the use of allergenic blood products. An increasing number of patients are now refusing blood transfusion for non-religious reasons. This has become an issue we can no longer sweep under the carpet. We have to confront it and find an amicable solution keeping in mind the world of Human Rights which dictates that we respect our patients' rights. In addition, blood stores are decreasing, and costs are increasing. Transfusion avoidance strategies are, therefore, desirable[13]. Safety and efficacy concerns of allogeneic blood transfusions and their impact on patient outcomes and associated staggering costs and restricted supply have fueled the quest for other modalities

and strategies to reduce use of blood components[16]. This mode demands that the patient blood management focuses on multidisciplinary and multimodal preventive measures to reduce or obviate the need for transfusions and ultimately to improve the clinical outcomes of patients is the major aim. Aryeh Shander et al go on to state the fact that patient blood management strategies can be applied at every stage of care to surgical and nonsurgical patients, and they generally fall under one of three categories. The known pillars of blood management are:

1. Optimizing hematopoiesis and appropriate management of anemia,
2. Minimizing bleeding and blood loss,
3. Harnessing and optimizing physiological tolerance of anemia through employing all available modalities while treatment is initiated.

The tools and modalities should be found to address each of the above pillars[16]. Aryeh Shander et al go on to state their minds more clearly by saying the following “The era of thinking of blood transfusion as a vitalizing treatment to improve patients' conditions and accelerate their recovery has now been superseded by judicious consideration of allogeneic blood transfusions when other, less-risky modalities are not available”

In addition to recognized transfusion-related risks such as infections, respiratory failure, and thromboembolic complications, red blood cell (RBC) particularly Rh patients transfusions may alter a recipient's immune function, impacting long-term survival [8]. Allergenic blood transfusion is emerging as a potent risk factor and as an independent predictor of, and contributor to, worse patient outcomes (eg, higher risk of morbidity and mortality). On the other hand, studies have shown that clinical outcomes of patients who are treated without (or with less) allogeneic blood transfusion are often similar to or better than the outcomes of patients who are transfused or receive more blood[8].

In our practice there are three major problems: Firstly, there is a reality that the availability of blood for transfusing in Zambia is becoming less and less year by year and leading to a large number of cases for surgery being cancelled often because the anaesthetists says no for surgery. Some of the patients have to stay a long time without surgical treatment because of this none availability of the needed surgery. Secondly, the low haemoglobin in our patient: Our policy is that any patient with Hb of less than 7g/dl of Heamoglobin is not fit for Surgery in the thinking that after surgery healing will take a long time and indeed the patient will have more complications. In fact any patient with a Heamoglobin of less than 5g/dl is never allowed to undergo surgery without Blood transfusion . Thirdly, the Issue of refusal of transfusion is no longer by the JWs only but the whole community is rethinking about blood transfusion.

Bloodless surgery is a term that has evolved in the medical literature to refer to a peri-operative team approach to avoid allogeneic transfusion and improve patient outcomes.

It is now the conviction of many a surgeons that we as a medical fraternity must relook at this issue: It is possible to perform bloodless surgery as long as we change our attitude, alter our surgical techniques, formulate an acceptable legal frame work for both ourselves and our patients[14].

AIM: The aim of this short paper is to look at the current practice of surgery with regard to blood transfusion in our hospitals and suggest areas where change is inevitable in order to comply with the demand for bloodless surgery.

Patients and Methods

This paper looked at how the community in Chingola viewed blood transfusion, it also reviewed the current policy regarding blood transfusion and the current transfusion practice at KCM mine hospitals.

In addition, a look at the various ways we can lessen the need for blood transfusion was done. In order to look at how the community looks at blood transfusion, a simple questionnaire was formulated as follows:

1. If you needed surgery and there was need for blood would you accept blood transfusions YES, NO, DON'T KNOW (Please circle your choice).
2. If your answer is not YES give the reason RELIGIOUS, FEAR OF HIV, BOTH, OTHER.....

For this purpose a small number of non patient visitors to the hospital were randomly selected and asked the above questions.

In order to review the current transfusion practice figures were obtained from the laboratory showing how much of the blood drawn was actually given over a period of one year (February 2001 to February 2002)

RESULTS

Community's View On Blood Transfusion:

Twenty adult visitors were willing to fill out the questionnaire. Their responses were as tabulated:

Table I: Response to blood transfusion.

RESPONSE	No. OF PATIENTS (%)
REFUSED TRANSFUSION	12(60)
ACCEPTED TRANSFUSION	07(35)
DOUBTFUL	01(5)

Table II: Reasons for refusing blood transfusion. n=12

REASON	No. OF PATIENTS (%)
RELIGIOUS.	03(25)
FEAR OF HIV.	05(42)
BOTH RELIGIOUS AND FEAR OF HIV.	02(16.7)
OTHER REASONS.	02(16.7)

Current Hospital Policy and Blood Transfusion problems

The following is the current practice on blood transfusion.

- A patient need only to give verbal consent to be transfused
- Any medical officer can order blood transfusion if they see fit.
- A patient may refuse blood transfusion and may sign form called Form V that absolves the medical officer of any responsibility should there be any complication as a result of such a refusal.

However, should such a patient require a procedure that needs blood transfusion, the medical officer performing that procedure is not legally bound by the said Form V and the following happen;

- The patient is denied the procedure. On grounds that the Medical Officer feels legally unsafe to accept the absolution
- The patient is “persuaded” to accept the transfusion as a trade off to have the procedure done
- A less than acceptable procedure is performed which leaves the patient not fully satisfied
- Treatment is delayed while the “blood battle” rages.
- These patients are viewed as trouble makers and difficult

Where minors are involved the situation is even worse: Children have been known to die while the Doctor and parent/guardian argue over the blood issue. The Zambian law does provide a way out through the Magistrate but the question is; suppose this child is disowned who would take care of it when discharged?

Current Blood Transfusion Pattern in the Hospital

In a three months period, the average blood transfusion tests in our hospitals were as follows;

Table III Blood transfusion tests and sent out to the patients monthly averages

MONTH	NCHANGA BLOOD UNITS	KONKOLA BLOOD UNITS
FEBRUARY 2002	1350	1585
JANUARY 2002	1350	1585
DECEMBER 2001	1468	1940

Konkola did more tests than Nchanga an indication that they also probably did more transfusions.

Use of the blood Units at Nchanga South Hospital during the same period was here shown.

Table IV: Use of blood at Nchanga

TOTAL UNITS ISSUED	TOTAL UNITS USED	TOTAL UNITS RETURNED
954	601	353
100%	63%	37%

Looking particularly at the surgical departments: On average 420 (70%) of the used units were used by the surgical departments i.e. General surgery ,Orthopedics and Obstetrics and Gynecology, and all the returned units came from the same Surgical departments, making a use rate of 54.3% of drawn blood units for the surgical departments.

Ways to Reduce the Need For Blood Transfusion

There are ways to perform surgery whereby the need for blood transfusion is reduced. In these times when it is not safe to transfuse anyone we as surgeons have no option but to adopt these methods.

AVAILABLE METHODS TO THE SURGEON

- Use of the tourniquet - for limb surgery offers a bloodless field and certainly reduces the need for transfusion. This is already being done we can only do more.
- Use of vasoconstrictors essentially Adrenalin solutions either infiltrated into the tissue before or during surgery or instilled on the wound. Adrenalin can also be used with local anesthesia it prolongs the effect of anesthesia, increases the safety margin and of course reduces blood loss. When adrenalin is used infiltration the preferred strength is 1 in 200,000 to 1 in 400,000 in solution of normal saline. When used with local anesthesia the author prefers a strength of 1 in 100,000 or 1 in 200,000 made up in local anesthesia of 0.5% or 0.25% lignocaine. With this mixture, large volumes of local anesthesia can be used without reaching toxic levels.
- Use of oxycell, surgicel and sylate. These are sporadically available.
- Haemostatic Agents.

Vitamin K (Phytonadione) is a synthetic product identical to a naturally occurring Vitamin K. It is required for the production of certain blood clotting factors (factors II, VII, IX and X) in the liver. Causes of vitamin K deficiency include inadequate dietary intake, poor absorption, and drug interactions (e.g., antibiotics, stroke medications). It is well known that vitamin K can be a useful adjunct in the management of hemorrhage.

- Planning surgery in such a way that large surgeries are split into small ones done over a period of time-this is however not always possible but it can be done.
- Use of cautery in skillful hands can greatly reduce blood loss. This is used a lot in laparoscopic surgery. The cautery can be used for both cutting and coagulation.
- C- Arm mobile image intensifier. Useful in orthopedics and cholecystectomy, allows percutaneous surgery.
- Blood salvaging equipment, useful in uncontaminated haemoperitoneum, haemothorax etc. One such equipment was available at Nchanga South and other hospital theatres but the expendables are hard to find.
- Haemopoetic substances can be used but they are sporadically available and/ or used.

Recombinant Erythropoietin (r-Hu-EPO) is a biosynthetic form of a natural human hormone responsible for stimulation of red blood cell production. It is manufactured using recombinant DNA technology, and has the same pharmacological effects as endogenous human erythropoietin, stimulating the bone marrow to produce red blood cells. The drug can be administered before, during, or after medical or surgical treatment to increase red blood cells production.

Iron and other hematinics are administered concurrently to support erythropoietin-stimulated red blood cell production.

When all is said and done the skill of the surgeon is paramount.

Available methods to the Anesthetist

The anesthetists target a blood loss of 800 milliliters as their trigger for blood replacement. They do the following to prevent this loss:

- Deliberate hypotensive anesthesia.
- Preoperative haemodilution
- Spinal anesthesia

In the situation we are in, they ought to be doing more of this.

Available methods to all concerned

- 1 Coordination between surgeon and anesthetist
- 2 Patient education regarding indications for blood transfusion.
- 3 Use of alternatives-Autologous blood, Homologous blood and the use of haematinics.
- 4 Strengthening of form V and making blood transfusion a consentable activity.(Appendices I and II)
- 5 Careful attention to the frequency and volume of blood sampling is peremptory. Studies have shown that ICU patients can have as much as 70 ml withdrawn per day, contributing to transfusion exposure[7].

Unavailable methods - wish list:

1. Minimally invasive surgical methods:

- Various options are available to limit the blood flow to the site of surgery, thereby limiting the blood loss. Examples include patient positioning to elevate the site of blood loss [8].
- Laparoscopic surgery. This needs equipment and training.
- Trans urethral resectoscopy for prostatectomy this is only available in a few centers in Zambia.
- Cryosurgical or Banding equipment for e. g. haemorrhoidectomy. This is also not commonly available in Zambia.
- Stapling guns for bowel resection and anastomosis. The equipment is available but there is no money to buy it. The skill can be mastered.
- Surgical lasers
- Argon beam coagulators
- Sonic Blades
- Gamma knife
- Argon beam

2. Haemostatic Agents. The following Haemostatic Agents are used to promote Clotting:

- Aprotinin is a naturally occurring agent isolated from bovine lung tissue that reduces bleeding during and after surgery. The mechanism by which aprotinin minimizes bleeding is thought to involve effects on platelet function as well as on coagulation and fibrinolysis.
- Desmopressin is a synthetic version of a naturally occurring hormone. Desmopressin causes a dose-dependent increase in plasma factor VIII, plasminogen activator, and, to a lesser degree, factor VIII-related antigen and ristocetin cofactor activities. Large IV doses of desmopressin increase factor VIII activity in healthy individuals, in patients with mild to moderate hemophilia A and B or von Willebrand's disease, and in patient

with uremia. This medication may also cause constriction of bleeding vessels so as to limit blood loss

- Haematopoietic Agents. To be erased
- **Neupogen:** A man-made form of protein that stimulates the growth of white blood cells in the body. White blood cells help the body fight against infection.
- **Recombinant Granulocyte -- Colony Stimulating Factor (r-Hu-G-CSF)** is a biosynthetic form of a natural human hormone that stimulates production of neutrophils (a specific type of infection-fighting white blood cell) in the bone marrow. It is manufactured using recombinant DNA technology, and has the same biological effects as endogenous human granulocyte colony-stimulating factor.
- **Neumega** is used to stimulate the bone marrow to produce platelets in order to prevent low platelets that may be caused by chemotherapy. Platelets are blood cells that allow the blood to clot, and prevent bleeding. It may be given to decrease the need for platelet transfusions.
- **Tranexamic acid** is a synthetic derivative of the amino acid lysine. It is an anti-fibrinolytic. It works by preventing blood clots from breaking down too quickly. This helps reduce excessive bleeding.
- **Recombinant Interleukin-11 (r-Hu-IL-11)** is a genetically produced form of a naturally occurring human hormone that stimulates the body's platelet production. Interleukin-11 is important in managing patients who receive drug therapy that tends to suppress the development of platelets, such as chemotherapy.

It is therefore possible to stimulate the body to make all the necessary cell lines.

DISCUSSION

The Wikipedia encyclopedia defines term Bloodless surgery as a “neologism” of relatively recent origin. The expression does not mean surgery that makes no use of blood or blood transfusion. Rather, it refers to surgical procedure performed without transfusion of allogeneic blood. Champions of bloodless surgery do, however, transfuse products made from allogeneic blood and they also make use of predonated blood for autologous transfusion.”The truth in reality is that bloodless surgery is a relatively new practice that facilitates that goal. However, the concept is either poorly understood or evokes negative connotations[14]. Despite all these reactions, we have come to know that the application of blood conservation strategies to minimize or avoid allogeneic blood transfusion is seen internationally as a desirable objective procedure. We have come to realize that even to us in Zambia, Bloodless surgery is a new practice challenge. We do not fully accept this concept either because we have not fully understood the concept or it has evoked negative reactions particularly among the Doctors.

In the developed world, the last twenty years have witnessed a surge of interest in bloodless surgery, for a variety of reasons but particularly the Jehovah’s Witnesses reject of blood transfusions on religious grounds; however, others are concerned about blood borne diseases, such as hepatitis and AIDS[3]. In Zambia we are fully involved in the above hot issue about blood transfusion and we must come up with a solution.

The figures presented in this paper (Tables I, II), though small, clearly point us to the direction that more people are skeptical about being transfused even here in our community. The reason is no longer only based on religious beliefs; there is now the fear of being unintentionally transfused with HIV positive blood. The indication is that more people would refuse blood transfusion because of this. This is a reasonable fear. One foresees a situation where the battles over transfusion with our patients will only grow hotter. In the end we as Doctors we will have to bow to the pressure from the patients[4].

The changing attitude to blood transfusion demands that this activity, a normal therapeutic activity, be reviewed, why? The consequences of a contaminated transfusion could be a slow painful death from AIDS with all its stigmas or for that matter Hepatitis B, C, and Non B non C hepatitis. In addition to recognized transfusion-related risks such as infections, respiratory failure, and thromboembolic complications, red blood cell (RBC) or Rh transfusions may alter a recipient's immune function, impacting long-term survival[10].

Naturally patients will want to protect themselves by resorting to the courts a thing no Doctor wants to ever happen in his or her life. The only way we can protect ourselves is by making blood transfusion a consentable activity and a change in our attitude to the issue of transfusion. We should no longer regard JW's as trouble makers but rather take the challenge, change the way we do things and offer our people a better service.

The transfusion habits differ from hospital to hospital depending on the particular individuals concerned (Table III) and is not possible that all of us will prescribe blood in the same way but an appreciation that this no longer a very safe item to give our patients need to be emphasized. A lot of us order blood which we do not give transfusion in our patients (Table IV), this is not only a waste of resources when one considers the cost of cross matching but also shows that a large number of our patients do not need blood after all.

In 1988 National Institute of Health (NIH) of Britain consensus conference on perioperative red blood cell transfusion the traditional transfusion trigger of a haemoglobin value of 10 g/dl has come under critical review. Clinical and physiological evidence suggests a much greater human tolerance of anaemia. Healthy resting volunteers were bled isovolaemically to a haemoglobin of 5 g/dl with no signs of compromised oxygen delivery. A subsequent group was bled to a haemoglobin of 4.8 g/dl and administered beta blockade to minimize cardiac compensation. No evidence of inadequate systemic oxygenation was apparent. Successful management of Jehovah's Witness patients has revealed a remarkable tolerance of severe acute anaemia[7]

Tolerable of course does not mean optimal. However, this knowledge can be used as a strategy to minimize transfusion. Lowering the transfusion trigger from 10 to 7 g/dl in critically ill patients in intensive care reduced red cell unit transfusions by 54% and improved clinical outcomes. While a number of practice guidelines have been published suggesting a transfusion trigger in the range of 6-7 g/dl they caution that a single figure should not become a substitute for clinical judgment[7].

One would like to see a situation where all the haggling over blood becomes a thing of the past and that the request for a blood cross match becomes an exception rather than the norm. We can begin by seriously considering alternative surgical techniques that will not make blood transfusion necessary.

The basic truth is that we are already practicing some of these methods but it is all at individual level. There is no consensus thus each man/woman is doing what they can. By behaving this way we are lagging behind. The world is changing towards bloodless surgery. In America there are hospitals that are dedicated to providing bloodless surgery. There about 180 hospitals around the world now which have programs specializing in bloodless medicine and surgery. As of 2011, in the US, there are at least 12 hospitals that specialize in bloodless surgery for infants, and more than 160 hospitals that have a dedicated full-time Bloodless Surgery Program [11]. They are developing techniques and testing them and are able to do Organ transplants without transfusion.

What is needed is the recognition of the increasing demand for bloodless surgery in the community as one young lady said "Blood transfusion nowadays is dangerous". This recognition should be at the official level leading to formulation of an official policy on the matter. A protocol on this subject should be done so that a standard approach is charted out.

Our attitudes to Blood transfusion are based on our history as a medical fraternity. With the advent of universal testing of all donor blood, the medical community embraced the idea that when in doubt, it was better to transfuse than not to transfuse. Now, with a clearer understanding of anemia and its effects on the body, this conventional wisdom is being challenged. We in the developing world are at risk remaining in the old mold despite the fact that most of us surgeons have avoided transfusion in most cases with patients functioning quite safely and comfortably after surgery, with only a fraction of the normal number of red blood cells, but we still want to request for blood to be present before we can carry out an operation, and yet it is well known among us that, the use of pharmaceutical agents, intravenous fluids, and improved diagnostic procedures and surgical techniques can prevent or lessen the anemia associated with surgery. One wonders why we still order so much blood! We also know that quite apart from its contamination danger, Blood transfusion is expensive and our resources cannot support the habit. Yet we are not willing to change.

What we require to do is plan ahead, discuss the various options with the patient and change our attitude that those who fuss about blood should have their wishes respected. This is where respect for our patients' wishes will start from. It is time to change. One would like to put it, as that we can do bloodless surgery. In fact bloodless surgery in the Europe encompasses the peri-operative period with surgeons, anaesthetists, haematologists, intensivists, pathologists, transfusion specialists, pharmacists, technicians, and operating room and ward nurses are fully involved. They are utilizing combinations of the numerous blood conservation techniques and transfusion alternatives now available[14]. We need to relook at blood transfusion. Some workers like Reeds et al went all the way and did hepatic resections surgery in 150 cases. They did their bloodless surgery by using the Control of venous haemorrhage during resection. They actually optimized the argon beam coagulation which lowered central venous pressure to between 0 and 4 cm H₂O by extradural blockade and systemic nitroglycerine infusion. They had a mortality rate of 0.7 per cent. Fifteen patients (10.0 per cent) had significant complications. Their mean blood loss was 814 ml for the whole study but only 434 ml in the last 4 years i.e. they became better at their work as they progressed[15]. It is a challenge but we can also do it.

CONCLUSION

We know that Blood transfusion has made a significant contribution to the development of medicine and surgery. However, in the last two decades, there has been forced considerable focus on infectious complications of transfusion with the result being that a blood supply is not completely safe. As a result there is a world rising refusal of blood transfusion on our people.

Secondly, the cost and supply have become major issues. Contributing further to the complexity is a more informed patient population that desires greater treatment choice and an increasing number requesting to avoid transfusion.

We have also come to know that an evidence-Based Medicine has recently emerged as the driving force behind the bloodless surgery current practice, with improvement of outcome as the major aim[9].

The bloodless surgery methods should be adopted in resource poor country because the current cost methods being used are not free and basically requires trained staff to implement the programs, all at a high cost. Zambia should not lag behind; it should go into developing the bloodless surgery. The Bloodless surgery program can be cost effective and may save many more lives for those would do not subscribe to allogenic blood transfusion.

APPENDICES.

APPENDIX I SAMPLE OF NEW FORM V

NCHANGA MINE HOSPITAL

**CONSENT TO OPERATIVE TREATMENT BY PATIENTS WHO REFUSES TO HAVE A BLOOD TRANSFUSION
FORM V**

To: The Medical Staff and Committee of Management of
..... Hospital

I hereby give my consent to the performance upon me of the operation of
.....

the effect and nature of which have been explained to me. I also give my Consent to the performance upon me of any other operative procedure which in the opinion of the Surgeon it may be necessary to perform upon me without having obtained my express consent, during or by reason of the said operation or anything connected with it; except that, although it has been explained to me that in the course of or by reason of the said operation it may be necessary to give me a blood transfusion so as to render the operation successful, or to prevent injury to my health, I hereby expressly withhold my consent to and forbid the administration of blood to me:

- 1. In any circumstance.
- 2. Except when it is absolutely necessary to save my life.

I accordingly absolve the Surgeon, the Hospital and every member of the Medical Staff concerned from all responsibility and from any liability to me, or to my estate, or to my dependants, for any damage or injury which may be caused to me, or to my estate, or to my dependants, in any way arising out of or connected with this my absolute/conditional refusal to consent to any such blood transfusion.

DATE: SIGNED:
WITNESSES TO PATIENT'S SIGNATURE: -

- 1. Witness.....
- 2. Witness.....

APPENDIX II SAMPLE OF NORMAL CONSENT FORM I

NCHANGA MINE HOSPITAL

**CONSENT BY PATIENT
FORM 1**

To: The Medical staff and management of Nchanga South Hospital

I of
hereby consent to undergo the operation of
.....

the effect and nature of which have been explained to me. I also consent to such further or alternative operative measures as may be found necessary during the course of such operation and to the administration of a general local or other anesthetic for any of the foregoing purposes. I understand that an assurance has not been given that the operation will be done by a particular surgeon.

I consent/do not consent to the administration of blood should should the need arise during or after the operation.

Dated this day of20.....

Signed:

Identification No:

1. Witness:

Mine No:.....

2. Witness:.....

Mine No:

NB: The patients who do not consent to blood transfusion should also sign
Form v.

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