



SABM[®]
SOCIETY FOR THE ADVANCEMENT
OF PATIENT BLOOD MANAGEMENT

August 2022

NEWSLETTER

**SABM NEWSLETTER
AUGUST 2022
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Featured Affiliates

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Consider submitting your future manuscripts in PBM for peer review and publication in this new section. The success of this endeavor will depend on the provision of material to make it lively and attractive to our colleagues and other professionals in the field.

**Members Invited to Submit
Papers [CLICK HERE](#)**

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Letter from the President



Welcome to the Summer SABM Newsletter!

We are certainly in a different place Summer 2022 compared to the prior two summers. Thankfully so! Although COVID-19 still remains with us, we do seem to have turned the corner moving closer to an endemic, which hopefully

is allowing us to come out of proverbial hiding and into the world again. This world is much changed, yet has provided opportunities to reflect, change and set sight on future endeavors, both personal and professional.

As an organization, SABM remains very much “alive”. The excitement is building as we return to a face-to-face Annual Meeting September 14th-17th. At last! Patient Blood Management and Blood Health: The Big Win is the theme. So *après pos* for our location at Caesar’s Palace in Las Vegas.

Our co-chairs, David Faraoni, MD, and Sarah Walbolt, RN, have secured an outstanding faculty with topics surrounding the newly published PBM global definition, the concepts of blood health, PBM in pediatrics, the annual sessions with ASA and NATA, how to engage the C-suite and so much more. We have over 40 scientific abstract submissions and will announce the 2022 Hemosonics Research Grant recipient.

NurJehan Quraishy, MD, and Tiffany Hall, RN, as co-chairs of the SABM Certificate Course, have worked with their faculty to provide the “live” course on September 14th. This course can be attended not only by newcomers to PBM, but as a refresher for those from more mature programs.

Our exhibitors are committed and look forward to visiting with you and your colleagues in Vegas. We thank them for their steadfast support during the past two years and so pleased to be mingling with them once again.

I wish to personally invite each of you to participate in the SABM Business Meeting, Saturday morning, the 17th. Leadership has been working diligently on the SABM strategic plan and we want to share this with membership, unveiling the updated mission and vision statements and focused goals for the society. We also will announce the 2022 Kathleen Sazama Award recipient along with the new Volunteer Leadership Award recipient. Board members, committee chairs and work group leaders will be available to welcome members to join us in our PBM efforts.

SABM is stepping out and stepping up with fresh ideas which will push the global PBM agenda. I am inspired by each of you and what you do every day on behalf of your patients and can’t wait to be a part of the conversations in Vegas. See you there!

Sincerely,

Carolyn Burns, MD



Looking for Newsletter Content

SABM members want to know:

- Do you have an interesting case study?
- News about your patient blood management program?
- News about a new program at your institution?
- Have an article about some of the latest technology?
- Submitted an article to a journal for publication?

Deadline for the Summer 2022 issue is August 1, 2022.

Don't wait! Send your articles today to the Newsletter Editorial team at info@sabm.org

Call for Interesting Case Studies

Authors: Can be submitted by any discipline (MD's, RN's, technologists, perfusionists, students)

Description/Format/components:

- Patient history and diagnosis
- Problem statement
- Relevant laboratory results or tests
- Medical management
- Follow up
- Brief discussion of the disease/problem/condition with up-to-date literature
- Provide 3-4 multiple choice questions
- Answers to questions to be provided on SABM website 2-3 weeks after publication
- Tables/Figures/images are welcome
- 5-10 annotated references

Call for Member Accomplishments

If you have been given an award, received recognition, or have been recently published, we would like to publish it in the next issue of the SABM newsletter.

Please send an e-mail with the details to info@sabm.org. Be sure to include your full name and details regarding the award, the recognition you received, or the publication citation.

Call for Book Reviewers!

The newsletter editorial team is looking for members to review books. You can choose to review a book that you already have, or volunteer to review a book of SABM's choice. If you have a book that you would like to submit a review for, or to be considered as a book reviewer, you can send an email to info@sabm.org with your request for consideration.



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HAEMONETICS[®]

How We Treat Anemia in the Pacific Northwest



St. Michael Medical Center - Virginia Mason Franciscan Health, Tacoma, WA, USA

Virginia Mason Franciscan Health (VMFH) is one of the leading healthcare systems in Washington State, providing healthcare services at 10 hospitals and nearly 300 care sites across the Puget Sound region as part of the CommonSpirit Health system. The Transfusion-Free Medicine and Surgery Program (TMSP) at VMFH provides regional coverage to six of those hospitals, including 2 large medical centers, spanning 3 counties.

The TMSP was established in 1999 as a bloodless program with a single staff member serving the Jehovah's Witness community at one hospital. Over the past 23 years, the program has expanded to employ 7 registered nurses specialized in patient blood management (PBM), who provide regional, 24/7 coverage to any patient with an objection to blood transfusion, whether that be a request for bloodless medicine or PBM services. In 2021, the TMSP offered support to more than 5000 patient encounters, including over 1000 surgeries.

The TMSP is a 2-tiered program serving patients who absolutely refuse blood transfusion, and those who wish to accept blood only after alternatives have been exhausted. Unit nurses identify patients who have concerns via a routine screening question on admission. When a concern is identified, the nurse notes this in the chart, triggering a passive alert to the TMSP office requesting a consultation. Unit nurses and clinicians may also page TMSP nurses for a prioritized response. Patients are assisted in completing advanced directives outlining acceptable alternative strategies to meet their specific, personal needs. These documents become part of their permanent medical record and are used to guide care for all encounters unless the patient expresses a desire to change them. Last year 35% of the patients expressed a religious objection and 65% expressed a personal or medical reason for blood avoidance. Over 70% of patients expressed an absolute refusal and requested bloodless advocacy services.

In addition to serving patients who formally enroll in the program, the TMSP provides support to clinicians who wish to reduce reliance on transfusion. During the Covid-19 pandemic, the TMSP services were promoted by our regional blood bank in an effort to reduce demand for blood in

response to the national blood shortage. The pandemic also peaked community interest in blood avoidance, with more patients requesting information on available alternatives. Many are expressing concerns about the potential for bloodborne transmission of the Covid-19 virus and Covid-19 vaccinations. This has increased requests for TMSP consultation and education.

According to the CDC, anemia is the primary diagnosis for 890,000 emergency room visits annually and the cause of more than 5600 deaths each year. Additionally, it has been established in literature that preoperative anemia is an independent risk factor for postoperative mortality; yet it is estimated that more than a third of all surgical patients are anemic prior to surgery. Processes for early identification and treatment of anemia have proven to be valuable tools for improving patient outcomes. This is especially true in populations that request blood avoidance.

The most common cause of anemia is iron deficiency. At VMFH, the TMSP used a benchmarking approach, researching evidence-based strategies for inpatient anemia management. Using best practices established by reviewing recent literature and successes within the PBM community, the TMSP proposed implementation of an order set for addressing iron deficiency anemia. This orderset was reviewed and approved by a multidisciplinary team and added to the electronic health record (EHR). The order set is used as a guideline for providers to manage anemia. It includes parameters for lab testing (including conservation strategies) and dosing recommendations for IV iron, hematinics, and erythropoietics, specific to hemoglobin level. It also has orders for hemodynamic support, GI prophylaxis and ancillary services (respiratory, nutrition, etc) to address critical, symptomatic anemias (for patients refusing blood). TMSP provides advocacy for proactive treatment and provides guidance to clinicians on how to access and utilize the protocol orderset. When patients fall outside of routine parameters, TMSP nurses encourage input from specialty service lines such as nephrology, hematology, OB, and pharmacy to review dosing strategies for those with complex presentations or comorbidities and ensures that proposed strategies are reviewed against patient directives to make sure treatments are aligned with patient wishes and that the patient is kept at the center of the care conversation.

Future goals for the program include a proposal to address treatment gaps between inpatient and outpatient settings via launch of a virtual anemia clinic. We also hope to increase collaboration with our "Surgical Home" to facilitate preoperative optimization. We have developed a pilot with one of our interventional cardiology teams that has been successful in reducing transfusion rates and are hopeful to expand that success to other service lines, and additional hospitals within our region. We also hope to contribute to the adoption of PBM throughout the CommonSpirit enterprise. We look forward to having PBM as the standard of care for all patients in the future and work earnestly to provide resources to meet that goal.

Contributors: Jennifer Min, BSN, RN; Kasey Herness, BSN, RN

Patient Blood Management is an Evolutionary Pause on the Journey to Bloodless Medicine: An Honest Approach to our Patients

This is a professional opinion based upon the keynote address of Bruce Spiess, MD, to the Bloodless Medicine & Surgery Society on Friday, May 20, 2022.

PBM is an advancement

Patient Blood Management (PBM) is an established quality patient care discipline based upon the principle that a patient's own blood is the best blood he/she will ever have. PBM has evolved to be a universal strategy across the world, although adoption is slow. The World Health Organization in October 2021 reinforced its prior policy with a timely "call to action".¹ Every health care worker is urged to read the policy statement. Few member states have adopted it and sadly few physicians have read this important paper. Why is another discussion.

PBM is an advancement, but it is yet immature and not fully evolved. PBM remains founded in a belief system that at some anemia "trigger" – low hematocrit (Hct) or hemoglobin (Hgb) – a transfusion would prevent impending morbidity and mortality. To date, science has found no consistent evidence of enhanced outcome at any given "trigger". With over 120 years of research, medicine does not know when transfusion helps. Yet the search for any evidence that transfusion is useful at a "trigger" goes on, unabated.

Blood transfusion does not increase oxygen delivery

Perhaps an advance in monitoring technology to measure tissue oxygen deficit, critical oxygen delivery, the Hgb of DO₂ crit in real time would allow for science to march forward and put to rest the erroneous concept that exogenous blood administration improves physiology. The concept of DO₂ crit and the Hgb at which the tissues no longer have adequate stable O₂ delivery is a vital concept, unfamiliar to most physicians.²

Circulating Hgb level is a useless surrogate for tissue oxygen delivery. Transfusion of banked blood either does nothing to tissue oxygen delivery or potentially makes it worse (up to 400% reduction in O₂ delivery).^{3,4,5} Even in the face of such solid physiologic data medicine continues to search for that one elusive and useful overarching universal "trigger". Such a number does not exist, it is a fallacy, a ghost of medicine.

Oxygen delivery is highly regulated, and stable over a very wide range of Hgb. Adding more Hgb (especially dysfunctional Hgb) to the central circulation does not increase tissue oxygen delivery. The level of Hct in capillaries is governed by physical fluid dynamics, and capillary guard cells that sense local O₂ levels. Capillary Hct is always stable between 12-15% and cannot be increased.⁶ Adding more Hgb "upstream" cannot increase capillary Hct unless the anemia is below DO₂ crit for Hgb. The capillary

stable level is the same Hgb/Hct level of DO₂ crit. Prior to modern refrigerated blood banking the indication for a person-to-person warm whole blood transfusion often was when the heart failed – at 2.5-3.5 gm/dL Hgb which is also mammalian DO₂ crit. A coincidence, of nature? Not likely.

Hgb is a buffer to control excess oxygen at the tissue level.⁷ Oxygen is a powerful biotoxin, and excess oxygen in our tissues leads to DNA damage, mutations and other disastrous consequences including apoptosis. Understanding how the microcirculation and Hgb work in conjunction to create constant continuous unbroken and very stable (within a very few mmHg partial pressure) low levels of tissue oxygen requires a shift in medical school teaching. Oxygen is delivered to tissues only in the dissolved state.

The fallacy of transfusion "trigger"

In the evolution towards PBM, transfusion triggers have changed. The trigger levels have decreased from 10 g/dL to now 7-8 g/dL but it seems no one has dared to question: could we have it all wrong? Is the basic tenet of a transfusion "trigger" just plain wrong? Should we use blood transfusion at all to remedy a low Hgb if it does not improve tissue oxygen delivery?

There are well over 62 randomized controlled studies of higher v. (slightly) lower transfusion triggers. These RCTs show either less transfusion is equal to or in some studies better than more transfusion. The latest one, the TRICS-III trial, found that more transfusion in heart surgery patients under 75 was not convincingly unambiguously equal. To be clear, there was not statistical advantage of more transfusion in this group. Yet TRICS-IV is being proposed to chase a potential signal that transfusion might actually work in this one sub-group! One must ask the basic question, if 62 randomized clinical trials showed no advantage to transfusion, why does medicine feel compelled to do yet another one, and another one?

Blood is a liquid organ

Medicine does not teach blood as an organ system. Consider in your own medical, nursing, pharmacy, or allied health education whether you had a semester course involving complexities of blood. Were there instead, a few scattered lectures in courses such as lab medicine wherein hemoglobin or blood typing were discussed? Every other organ system had its own course – why not blood?

Medicine has focused upon the oxygen carrying capacity (a calculated number) of hemoglobin, and until recently had little understanding of the complexities of the microcirculation, the highly regulated and buffered flow of oxygen from the blood to tissues. Since the 1640's when transfusion was first considered, medicine has made many ill-founded assumptions regarding blood, its functions, with many myths still being promoted today in our education.

International PBM – Africa

PBM – a step in the right direction, but more steps needed

PBM is an evolutionary step to reduce dependence upon banked blood. That is laudable, but perhaps ultimately inadequate. PBM provides a discipline to reduce dependency upon banked blood, but it does not challenge the basic assumption that transfusion at some point is necessary or good. That assumption is in itself fundamentally wrong.

We cannot prove everything with RCTs. Patients have undergone heart surgery and liver transplantations with Hgb at or below 1 gm/dL. Electively taking patients to these profoundly low levels of Hgb is not practical. There are today many case series by credible and famous physicians which have shown that patients who decline donor blood do as well or better than patients treated with “standard” transfusion therapy. Indeed, their mortality is lower both at the time of surgery and after five years. What is the death rate if you cannot transfuse? It is better than if you accept medicines assumptions on transfusion.

There are thousands of papers regarding transfusion and adverse outcomes, yet some continue to attack those as not RCTs. Bradford-Hall states that when retrospective data all point in one direction then cause and effect are at play. When is enough? When do the ethicists get involved and say, well you did 62 trials, are you not putting people in harm’s way by enrolling them in unnecessary studies?

Bloodless medicine – the ultimate destination of PBM!

PBM is based upon a vision that by reducing the chances that an individual patient will hit a certain Hgb “trigger” the patient will escape transfusion, and thus morbidity and mortality will be reduced. That is wonderful and laudable, but

it still supposes that a yet to be discovered “trigger” actually exists.

Until we have scientific evidence of a trigger enhancing outcomes, we must stop endangering our patients with a therapy of doubtful benefit but proven harm. We suggest that until such time as medicine knows when to transfuse, the honest approach is to state that bloodless medicine is the default. The public deserves the truth not false hope.

Contributors: Bruce D. Spiess, MD; Nathaniel Usoro, MD

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The logo for SABM Patient Blood Management Awareness Week 2022 features a red blood drop icon with a caduceus symbol inside, positioned above the text 'SABM' and 'SOCIETY FOR THE ADVANCEMENT OF PATIENT BLOOD MANAGEMENT'. Below this, the main text 'SABM PATIENT BLOOD MANAGEMENT AWARENESS WEEK' is written in large, bold, teal letters. To the right of the text is a circular arrangement of various medical icons in teal and dark blue, including a syringe, stethoscope, ECG, and other medical equipment. At the bottom, the dates 'November 7-11, 2022' and the hashtag '#PBMAW2022' are displayed in teal, followed by the larger hashtag '#SABMPBMAWARENESSWEEK'.

Blood—Seeing It in the Right Light



Photo by ANIRUDH on Unsplash

Blood has been a subject of science, emotions, industry, and many times had been on the forefront of the ‘battlefield’ in medicine. In the many years that this subject has surfaced, the focus has been on the blood that is outside the human body. There have been numerous research drives and attempts to make this “external” blood freely available and safer, to enable its use for many conditions, few with good evidence, whereas most without tangible data. This is especially so from an oversimplification, when the “external” blood use is mainly to raise an arbitrary number within the complex systems in the human body.

Extensive data over the years revealed that misplaced emphasis and indiscriminate use of this “external” blood found in blood bags, have not only increased costs, does not offer a cure but also causes harm and numerous untimely deaths. It is a mirage and provides a false sense of security to the ones using it, as if, its use alone would correct all conditions, thus other logical or timely measures may not be absolutely necessary.

This may cause some to ponder, which blood is more valuable? Is it the blood in the bag? Or the blood in the body? It is of no doubt, that the blood in the bag is precious. After all, it had been given by a well-meaning person who wants to save lives. Work and money are also involved in its preparation. However, it is worth considering the high value of the blood that is within a human body itself. This blood within the living being touches all organs in the body and interacts with them. Within the body of a living being, blood is dynamic, “alive” and gives life to the whole organism. It is a highly precious liquid organ that is meticulously orchestrated to nourish, clean, facilitate repair, finely balance between clot and bleed, provides identity within the DNA, and much more. Being dynamic, the blood system in the living organism is able to respond to the body’s needs, thus more blood in the body can be generated/conserved according to the needs, given the right chance, support and time. To simply relegate this blood as second place, something easily replaceable with the “external” blood in the bag, using

oversimplified estimations or numbers is a disservice to the human body itself.

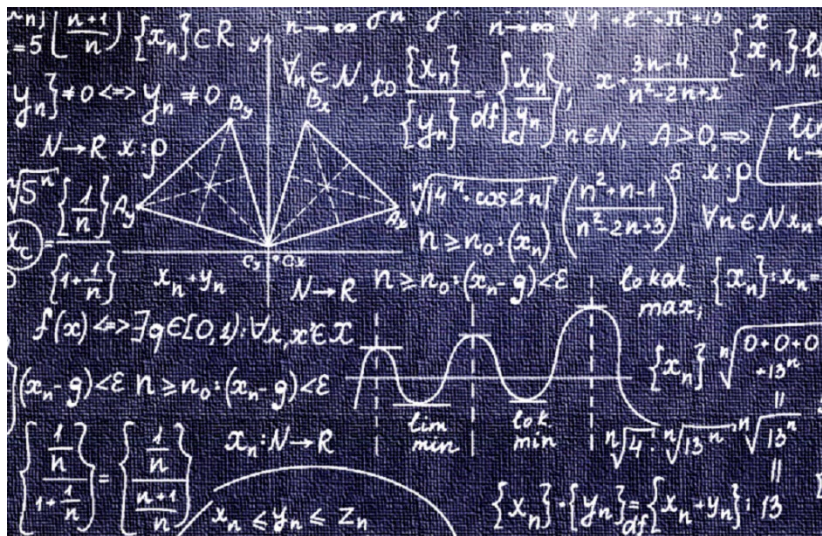
This brings one to consider a series of questions: Would a person use their own money wastefully? Or would a person gift or donate their money indiscriminately, regardless of how it will be used (even though it may be used wastefully)? What is the value of the blood in a living organism? What is the value of an organ such as the kidney, lung, liver or heart? Is not blood also an organ? Why then has this blood within the human body been allowed to be wastefully lost by poor bleeding control, even being thrown away after reaching the suction canister? If blood is a valuable liquid organ, should not bleeding be stopped or hemostasis optimised so that no more is lost?

It is an irony that the cost of technology or strategies to conserve this valuable internal blood is not considered to be worth the investment, due to the belief that this blood is easily replaceable with the “external” blood from the bag. It is of interest too, that in many areas, the medical fraternity and authority have had the impression that medications or therapy to generate one’s own blood within the human body is also expensive as compared to the “external” blood in the bag which are “free of charge (FOC)” when transfused. The term FOC is a misnomer for this “external” blood in the bag comes with a high cost—the liquid organ given by a sincere donor frequently causes iron deficiency in the donor. Besides that, the blood in the bag incurs high cost from the multiple steps involved in the collection, processing and administering. The only reason why it may seem that it is FOC is that the user didn’t have to pay for it, as it is heavily subsidised by authorities in some countries. Has mankind unwittingly missed the diamond while being too busy collecting stones, thus missing the high value of this liquid organ blood, within the living organism?

The vicious cycle of wasting or not optimising the blood within the human body, thus causing increase demand in the inappropriate and avoidable use of the “external” blood in the bag which finally results in poor outcomes and more shortages will not end unless blood is viewed in the right light. Instead of being degraded as something easily replaceable, the blood in the human body should be viewed with high esteem and respect, just as other organs and systems in the body. All measures should be taken to safeguard it and to increase its worth, just as how one would do with something as valuable as gold or diamond. If each individual person from all walks of life views the blood in their own body in such high regard, it could be the key to freedom from the vicious cycle and will lead to better health and a more robust economy. That is something that patient blood management and bloodless medicine and surgery in the truest sense is capable of doing.

Contributor: Ananthi Krishnamoorthy, MD

Data Science: The Next Revolution In Patient Blood Management



Data Science will lead the next revolution in Patient Blood Management. That may sound like a big promise, but not one that is far-fetched. In simple terms Data Science is the field of study that seeks to extract meaning from data. It includes the use of statistical and machine learning algorithms to predict and forecast events. Much like Patient Blood Management, Data Science has exploded in the last decade. It is much faster and cheaper to collect, store, and analyse big data using modern tools and techniques, and as a result virtually all industries and sectors have experienced an increased appetite for data to better drive decision making.

This trend has led to the increasingly popular role of the Data Scientist. In a very short timeframe, the Data Scientist has transitioned from little-known to in-demand, even being branded the sexiest job of the 21st century by the Harvard Business Review in 2012.

As with any new field it can be difficult to know how much of the promise is hype. However, for those with doubts it is worth considering the sectors and industries where Data Science projects have led to successful change. For example, the sports sector is littered with case studies where the in-depth analysis of real-time big data has changed the way the games are played, and the way players are managed. The implications however go far beyond sporting results.

Mr. Shiv Meka is Lead Data Scientist at the East Metropolitan Health Service in Western Australia. He has successfully led data science projects in a variety academic and non-

academic industries and is considered an expert in using machine learning techniques to predict outcomes. Mr. Meka has seen how machine learning can accelerate discovery and research. He says, “machine learning helps distil spatial-temporal correlations in higher dimensions otherwise inconceivable to the human.”

The role big data, data scientists, biostatisticians, and predictive analytics play in the health care sector will become increasingly important for patient care. Several research projects are underway to investigate the potential benefit machine learning algorithms can bring to Patient Blood Management.

Mr. Adam Lloyd, Director of Data and Digital Innovation with the East Metropolitan Health Service in Western Australia, is a leader in using healthcare data to drive improvements in patient care and has published research in the field. “Our previous research has highlighted that red cell transfusion is very predictable in several key patient groups,” Mr. Lloyd said. “We’re currently looking at applying our predictive models to assist clinical teams better target patients for preoperative screening and treatment.”

This research is important. Transfusions are considered one of medicine’s most overused procedures and they cost the healthcare system billions of dollars. Future research efforts are underway at the East Metropolitan Health Service that aim to develop early prediction models for post-surgical bleeding and transfusion. Initial phases of this research include assessing the feasibility of combining the results of continuous non-invasive monitoring devices collecting high-frequency real-time data on patient vital signs, hemoglobin results, risk factors for bleeding, and other available measures.

Experts have stated for some time that transfusion has historically been based on physician behaviour rather than evidence. Given this, Data Science’s potential to drive improvements in the Patient Blood Management setting is exciting. Only time will tell what the true impact will be, however it appears safe to say that those successfully leveraging data and turning it into insights and actions will thrive. Those who don’t will fall behind.

Contributor: Kevin Trentino, MPH, PhD

Zeno's Dichotomy Paradox and Shared Patient Decision-Making



Zeno shows the Doors to Truth and Falsity (Veritas et Falsitas). Fresco in the Library of El Escorial, Madrid. (Image in the public domain).

Patient blood management (PBM) ensures that a patient's blood is acknowledged and managed as being an important component of clinical care in optimizing individual patient's outcomes, in all medical and surgical settings. As a corollary to successful PBM allogeneic blood transfusion is minimized or avoided and ethical stewardship of altruistically donated blood is ensured.

The language, lexicon and acronyms of medicine are complicated and at times confusing for patients. Thoughtful attention to the words and expressions used can lead to better understanding and fostering collaborative and trusting relationships with patients.

The ancient Greek philosopher Zeno of Elea is best known for his motion paradoxes that stimulate thinking and can aid in decision-making. Resolving Zeno's Dichotomy Paradox is such an example that assists in critical decision-making and scenario planning. Zeno's Dichotomy Paradox is based on the following proposition. You are standing in a room intending to leave via the door so you start by walking to a point halfway towards the door. If you continue and repeat walking to the next halfway point, you will never reach the door. The paradoxical outcome of this "logic" is that you won't be able to leave the room. By changing your "logic" to focusing on your goal of being outside the room you will be successful.

Falling victim to Zeno's Dichotomy Paradox is common and is a manifestation of processes dominating and jeopardizing goal-directed outcomes. The American sociologist, George Ritzer, warned us in his 1993 book *"The McDonaldization of Society"*, of the dangers of serial processes dominating ultimate goals and outcomes in relation to many aspects of society as we increasingly witness managerialism subjugating leadership.

It is important not to jeopardize clinical and patient outcome goals and expectations by allowing process KPI's and surrogate endpoints to dominate a clinical pathway. PBM is a parallel iterative process of professional clinical decision making in the broader context of a clinical pathway that includes the patient and their carers/advocate, always keeping the outcome goal/s clearly visualized on the clinical and patient horizons. Some PBM clinical pathways can be protocolized within process without jeopardizing effectiveness by focusing on efficiency but not losing sight of the ultimate goal. Other PBM pathways are complex and

should be *à la carte* rather than *table d'hôte*. Patients need to understand both process and anticipated outcomes and the inevitable and inherent uncertainties. This is achieved by a multidisciplinary approach with personalized management plans shared and decided on with the patient or their substitute. The physician-patient relationship is an integral component of medical practice and the fundamental link between patient and physician based on trust and honest communication.

PBM demands accurate and timely diagnosis in all disease contexts starting with the blood related questions, *"What is the status of the patient's blood?"* *"If there are specific abnormalities in the blood, how should they be managed?"* and *"If allogeneic blood transfusion is considered, is there no reasonable alternative therapy?"* It should be communicated that there are valid reasons to implement a non-transfusion default policy when there is clinical uncertainty and debatable evidence for the effectiveness for allogeneic blood transfusion.

Patients must be informed and understand the diagnosis, the nature, severity and prognosis of their disease, and treatment options, including the benefits and risks of treatment and no treatment. As part of this clinical-patient interaction there are multifaceted medical, legal, ethical, and economic issues encompassing shared decision-making, patient choice, and informed consent. Variability in patient circumstances and preferences, the complexity of medicine, and the machinations of healthcare systems in which consent takes place can be bewildering for the patient in providing informed and valid consent.

Adding "patient" to the concept of blood management differentiates it from "donor" blood management to avoid confusion and the perception that PBM is a specific medical intervention. Personalized PBM is tailoring the patient's blood management to the specific characteristics of each patient. Patients can usually be reassured that there is nothing out of order with their blood, in which case the focus of PBM is to keep it that way by minimizing blood loss, maximizing physiological reserves and allowing Nature's homeostasis to respond. In some circumstances a hematologist may be involved as a patient's blood advocate when abnormalities require expert involvement while the primary disease is being managed.

Zeno's Dichotomy Paradox and Shared Patient Decision-Making

The involvement of patients in determining their own care is empowering and is a central tenet of patient autonomy, shared decision-making and high-quality healthcare. The essence of shared decision-making encompasses a patient-centered collaborative relationship of trust between a patient and their healthcare providers. This relationship focuses on bringing together patient values, goals and preferences in the context of the patient's understanding the disease and best available evidence about treatment options, their benefits, risks and uncertainties. A common criticism of physicians and medical education is focusing on mechanisms and treatment of disease to the detriment of the "practice of medicine" and "care for patients".

When patients enter the healthcare system, by choice or otherwise, aspects of their life become medicalized, monetized, legalized, and controlled. A patient's sense of

agency and freedom of choice should be at the center of meaningful, ethical, and legal informed consent.

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The journal *Anesthesia & Analgesia* has a PBM theme issue for September 2022 that includes an article by the author and his colleagues titled: "Patients' Choice, Consent, and Ethics in Patient Blood Management" available here: <https://journals.lww.com/anesthesia-analgesia/pages/currenttoc.aspx>

James P. Isbister, MD, is the 2008 SABM President's Award Recipient.

International PBM – Europe

Managing Iron Deficiency Anaemia—Our Experience at Maria Pia Hospital, Torino, Italy

Iron deficiency anaemia (IDA) currently affects 1.2 billion people and iron deficiency without anaemia (ID) is at least twice as common. Iron deficiency without anaemia is an under-recognized diagnosis in patients undergoing cardiac surgery, generally due to suboptimal screening recommendations. A combination of tests, including haemoglobin and ferritin levels, as well as transferrin saturation should be requested. Patients suffering from ID should be treated regardless of whether they are explicitly defined as anaemic.

At Maria Pia Hospital, a cardiac center in Torino, we decided to perform screening of ID in the preoperative and postoperative setting in both anemic and non-anemic patients. All patients arriving to our clinic undergo lab test including hemoglobine (Hb), Iron, Ferritin, Transferrin and Transferrin Saturation. The day after surgery, while in the ICU, iron kinetics are assessed again. When ferritin levels dip below 30 µg/L, ID can be ascertained. Ferritin is an acute-phase reactant that is increased in serum during chronic inflammation. Cut-off values for ferritin in ID are increased to 100 µg/L in states of chronic inflammation. Transferrin saturation (TSAT) levels below 20% are also diagnostic of ID. In chronic inflammatory conditions when ferritin levels are 100–300 µg/L, TSAT should be used to diagnose ID, while erythropoietin (EPO) might be indicated with the purpose of mobilizing stored seized iron. Serum iron levels fluctuate throughout the day and should not be used for diagnosis.

When ID diagnosis is established Iron supplementation is mandatory. In our center we use Ferric Carboxymaltose 500-1000 mg depending on weight and the level of Hb. It is of note that many patients receiving preoperative IV iron still manifest a certain degree of ID in the immediate postoperative period, hence, it can be a useful tool to assess iron kinetics in all patients in day-1 after surgery and treatment of ID if present. A new determination of iron levels appears to be reasonable in 3rd-4th day after surgery, when

the nadir of postoperative Hb is usually observed and when the incidence of transfusions appears to be higher: the result of this lab test might guide clinicians in assessing the indication for transfusion or not in patients with low postoperative nadir if Hb but persistent ID, since transfused RBC are likely to induce immunodepression and hemolyze shortly after infusion depending on their age and storage time. The impact of all these measures needs to be assessed in terms of well-being, outcome, reduction of RBCs transfusion, ICU stay, days in the ward, infections, etc.



Photo by National Cancer Institute on Unsplash

Anaemia is just one of the consequences of ID. Highly metabolic cells such as cardiomyocytes and skeletal muscle cells are dependent on iron for optimum functioning. Iron deficiency directly affects human cardiomyocyte function, impairing mitochondrial respiration, and reducing contractility and relaxation. Restoration of intracellular iron levels can reverse these effects and significantly reduce symptoms like mental fatigue, headache, restless legs, shortness of breath, physical fatigue and exhaustion. Hence iron therapy should not be seen solely as a Hb levels' restorer but as a therapy that can help in improving the quality of life of our patients.

Contributors: Lara Oller, MD; Samuel Mancuso, MD

Presenting Interesting Case Studies

Looking Behind the Curtain: Hands on Resident Education in Blood Bank and Patient Blood Management Provides Resources Needed for Optimal Care

Blood transfusion is one of, if not, the most common inpatient procedure performed in the United States. There is evidence that most physician's lack sufficient training in transfusion medicine to best prepare them to make evidence based decisions on transfusion and may lead to inappropriate practice. Identifying specific deficiencies is a first step to development of curricula to improve patient care. In one US study, 83% of physicians reported having about 1-2 hours of transfusion medicine education throughout their medical school curriculum.¹

In another study, study members of an international organization comprised experts in transfusion medicine (Biomedical Excellence for Safer Transfusion [BEST] Collaborative) developed an exam based on the most common transfusion medicine topics. This exam was then administered to internal medicine residents.²

- A total of 474 residents at 23 internal medicine programs in nine countries completed the exam
- Most of the participants failed the exam with a mean score of 45.7%
- The mean score for Postgraduate Year (PGY) 1 (43.9%) was significantly lower than for PGY3 (47.1%) and PGY4 (50.6%) residents.
- Nevertheless, 65% of residents surveyed would find additional transfusion medicine training "very" or "extremely" helpful

As a patient blood management initiative, our transfusion medicine service offers an elective 1 week rotation in which visiting off service residents and medical students can observe technical staff, residents, fellows and blood management nurses. Additionally they meet with each attending for didactic education and discussion on topics relating to transfusion, coagulation, apheresis, stem cell, and lab medicine. Time spent with our resident and fellow is meant to be observational of service requirements and job duties as well as an opportunity for informal discussion and resource sharing.

Daily Activities include:

- Morning Blood Bank Operational Meeting
- Processing blood components, washing, thawing, etc.
- Observe Medical Technologists at bench doing type and screen
- Follow a blood unit from order to transfusion
- Meet with Faculty and Senior Staff
- Observation of Blood Bank Resident performing the daily on call responsibilities
- Observe TEG and Platelet Mapping procedures and discussion.
- Attend our weekly clinical pathology on call conference where we discuss, as a group, the most important clinical cases and calls of the week
- Attend our clinical pathology rounds
- Attend one of our department's grand rounds

Topics covered include:

- Our medical center Transfusion guidelines
- Blood products inventory
- Massive transfusion policies
- Whole Blood administration
- Type and Screen and DAT tests
- Antibodies identification
- Rhogam evaluation
- Anemia Management
- Patient Blood Management Program
- Anticoagulation reversal
- Coagulopathy management
- Platelet dysfunction
- Coagulation tests
- Apheresis procedures
- Stem cell collection and processing
- Discussing blood component requests with ordering providers
- Transfusion reaction management

We have had the opportunity to host residents, and fellows from various specialties such as, anesthesia, cardio thoracic surgery, pediatrics, and hematology- oncology. We recently have also expanded to allow for a 2 day elective for interested medical students. Of note, this service started first with anesthesia residents as an elective rotation. However, soon after, blood bank/transfusion medicine rotation became a one week required rotation in the anesthesia residency program curriculum with the possibility of more elective time if needed. We also opened channels and ease communications between our different departments and our blood bank/transfusion medicine, clinical laboratory, and our clinical pathology residents, staff, and attending for any scientific discussions, and to share any information and resources.

Future plans include increasing this service to more residents and fellows from different departments. Including our visiting residents in some on call activities with our on call residents. In addition, attending coagulation cases sign out with our coagulation resident and on call attending. Developing a rotation entrance and exit quizzes of 10 questions or so to evaluate their initial and post training transfusion medicine knowledge.

Past learner anecdotes:

We encouraged and welcomed any feedback from all residents and medical students and here are some of the comments shared with our education coordinators.

PGY3 anesthesia resident: *"While in the OR I was able to interpret a TEG tracing and make recommendations on a bleeding patient to my attending. Using the right blood products at the right time slowed the bleeding and allowed the surgeon to continue the procedure. He was impressed with my knowledge and I am thankful for the training I received by the transfusion medicine team. The patient went on to a complete recovery and received only the product he required."*

"I was not even aware of the scope of transfusion medicine and the great resources they can provide."

Presenting Interesting Case Studies

Second year hematology oncology fellow: *“The patient blood management team provides a great service to both the hospital and patient care. I learned the scientific reasons behind our transfusion medicine guidelines for each blood product. I am excited to learn more about blood management and how I can provide the best outcomes to my patients by using less resources.”*

PGY2 internal medicine: *“While working in the ICU a patient needed blood emergently. I knew exactly who to call was able to easily communicate and coordinate with the blood bank staff to get the products in a timely fashion. My time in the blood bank allowed me the opportunity to clarify this procedure, communicate my needs, and obtain what was needed.”*

Time spent observing and meeting with blood bank faculty and staff allows the medical staff to see behind the curtain.

This program has allowed to educate our residents and fellows from different departments the blood management strategies and to create allies and champions hospital wide. We also indirectly improved our providers’ transfusion practices.

Contributors: Christine M. Cahill MS, BSN, RN; Majed A. Refaai MD

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Transfusion-Free Liver Transplant at Keck Medical Center

American Transplant Congress | ATC 2022 June 4-8, 2022

Transfusion-Free Liver Transplant (TFLT) at Keck Medical Center, University of Southern California, Los Angeles, is well known throughout the Pacific Region. It was an honor and privilege to join members of TFLT, Aaron Ahearn, MD*, Yuri Genyk, MD, and Helen Han, MD, for a presentation during the American Transplant Congress (ATC 2022), Sunday, June 5, 2022, held at the John B. Hynes Convention Center in Boston, MA. The TFLT presentation was entitled “Strategies for Reducing Blood Loss During Transplant and Serving the Transfusion-Free Community.” The key objective was to discuss strategies to decrease or eliminate blood products in organ transplant recipients to improve access to transplant.

My presentation was on the topic “Consideration from JW perspective,” with the primary objective to explain the rationale of Jehovah’s Witness (JW) patients’ choice to refuse blood and blood products, also to help the audience gain a better understanding of JW beliefs regarding organ transplants. I presented “myths” and “facts” regarding autologous or auto-transfusion devices and procedures, e.g., cell saver, acute normovolemic hemodilution (ANH), etc., in comparison with pre-autologous donation (PAD). I also discussed what has often been viewed by clinicians as a contradiction when consulting with JW patients who present for organ transplant evaluation. The fact that trace elements of blood might be found in the donated organ leads many to believe that it is contradictory, even “unethical” for a JW patient to accept an organ transplant but not blood products. However, these trace elements are not equivalent to receiving a blood transfusion, and the intent and motive is not to “therapeutically benefit” from them. Historically, this clarified understanding proved beneficial to our multi-organ transplant team at Keck; a member of our cardiac transplant team was able to overcome an initial reluctance and move

forward with evaluating JW patients for surgery. Of note, the first bloodless cardiac transplant was performed in June 1999, a young man from Alaska—our cardiac transplant team performed 5 bloodless transplants from 1999-2005.

The presentation was well received with audience members (in person and virtual) asking specific questions related to managing JW patients without violating their personal conscientious feelings. An anesthesiologist inquired about establishing a transfusion-free program, or if not, how to improve their policies, procedures, and protocols to improve the overall patient experience. A special thanks to Linda Sher, MD, for her support and efforts to include this presentation at ATC 2022.

Contributor: Randy Henderson

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Perioperative Management of Liver Transplantation During Unprecedented Severe Blood Shortage

Ronald Reagan UCLA Medical Center Los Angeles, CA, USA

The COVID-19 pandemic has led to many direct and indirect shortages in healthcare resources including medications, equipment, staff, and supplies. Hospitals worldwide faced severe blood shortages.¹ Contributing factors were multifactorial and downstream effects of the COVID-19 pandemic. These included decreases in donations due to donor concerns and fear, decreases in donor blood drives, limited staff, increase in staff workload, and decrease in reagents and other crucial supplies.¹

At our transplant center, which is also a Level I trauma center and tertiary referral center, we experienced severe and unprecedented shortage of blood products, particularly in type O blood. Liver transplantation is a procedure which can be associated with major hemorrhage and may require massive blood transfusion.² Liver transplantation in patients with type O blood required significant advanced planning and management throughout the perioperative period during the blood shortage. At the time of the liver transplant offer, a conference call between the transfusion medicine team, surgeon, anesthesiologist, and hospital medical officer occurred. Attendees discussed patient bleeding risk, current type O inventory, possible additional red blood cell units that could be secured, and whether the bleeding risk matched the available blood supply. Issues such as patient blood antibodies were also discussed. In very rare cases, the liver transplant offer would be deferred for a patient with extremely high bleeding risk anticipated to require more RBC units than available in the hospital and/or able to be obtained. While our aim is to transplant patients who are in greatest need of a liver transplant, in this case it was necessary to match the transplant with the available blood supply, as well as conserve resources for other high bleeding risk procedures (trauma cases, emergency cardiac surgery, etc.) Preoperatively, the primary patient team also initiated talks with family members of the patient to encourage directed donations and/or blood donations. Any donations not used for the patient went to the blood bank inventory.

During liver transplantation, we employed a variety of blood conservation strategies. Bleeding risk was discussed in the surgical time out with the surgery, anesthesia, and nursing teams. The anesthesia, surgical, and blood bank teams maintained close communication during the case with frequent updates on transplant progress, transfusion requirements, and blood bank inventory, as well as discussion when the need to obtain blood from outside sources arose. When clinically appropriate, a red blood cell

salvage device ("cell saver") was used to collect and transfuse salvaged red blood cells.³ A point-of-care testing machine requiring very small sample volumes was used for testing of hemoglobin, electrolytes, and arterial blood gasses. Viscoelastic testing was used for guiding medical management of coagulopathy.³ Mobile refrigerators were brought to the operating room to keep blood products at a constant temperature and to minimize waste. Newer technology and surgical methods such as argon beam coagulation and vessel sealing devices also contributed to decreased blood loss. In some cases requiring prolonged surgical hemostasis, a damage control strategy was employed where the abdomen was packed and anastomosis of the bile duct was deferred.⁴ Postoperatively, when patients were transferred to the intensive care unit for further care, a multidisciplinary handoff occurred that included discussion of the current patient transfusion status and latest inventory update.

While the blood shortage of 2022 has eased for now, we anticipate that there will be more shortages of blood products in the future due to pandemics, mass casualties, and other unanticipated disasters. Multidisciplinary planning and perioperative blood conservation strategies can be employed to take safe care of liver transplant recipients.

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Perioperative Management of Liver Transplantation During Unprecedented Severe Blood Shortage

Perioperative Management of Blood Shortage in Liver Transplantation

Preoperative Measures

- Preoperative multidisciplinary conference call

Discussion Points

- Patient bleeding risk
- Current inventory of matching units for patient
- Possible sources of additional units
- Other issues affecting blood product availability (eg, antibodies)
- Blood donations and directed donations encouraged from family members
 - Any donations not used for patient go to inventory

Intraoperative Measures

- Surgical time out: discussion of bleeding risk, blood conservation measures to be employed, and current inventory
- Close, real-time communication between blood bank staff, anesthesiologists and surgeons about progress of surgery and blood products needed
- Use of red blood cell salvage (“cell saver”)
- Viscoelastic testing to assess coagulation status
- Point of care blood testing requiring very small sample volumes
- Employment of mobile refrigerators in operating room for product storage
- Use of newer surgical methods and technology promoting hemostasis
- Surgical damage control strategy if needed

Postoperative Measures

- Multidisciplinary ICU handoff discussion includes patient transfusion status and inventory update



This figure depicts use of a “cell saver” device during liver transplantation. Blood is suctioned from the surgical field, mixed with a citrate or heparin solution, collected in a reservoir, and centrifuged. The red blood cells are then mixed with saline to reinfuse to the patient.