

Episode 36: The Surprising Benefits of Becoming a Repeat Blood Donor

Tony Casina:

Welcome to QuidelOrtho Science Bytes. We're proud to sponsor this podcast as a continuing commitment to transform the power of diagnostics into a healthier future for all.

Today, our topic is, The Surprising Benefits of Becoming a Repeat Blood Donor. I am Tony Casina and today we have a very special guest. I am joined by Dr. Mark Levine. Dr. Levine is a clinical professor at the University of Colorado School of Medicine and the Colorado School of Public Health. He serves as a faculty associate at the University Center for Bioethics and Humanities, where his prime interests are in health, professional education, history of medicine, and community empowerment.

Dr. Levine served for 14 years as the Chief Medical Officer in the Denver office of the Centers for Medicare and Medicaid Services, during which time, he was active in developing and maintaining agency initiatives in clinical quality, payment reform, and value-based purchasing. As an alumnus of Rutgers College and Temple University School of Medicine, Dr. Levine completed his residency training in internal medicine at the hospital of the University of Pennsylvania and fellowship in clinical immunology at the University of Colorado.

Dr. Levine founded the Colorado Patient Safety Coalition and served for several years as its president. He also served for many years as a delegate to the American Medical Association and as a member and chair of its council on Ethical and Judicial Affairs. Dr. Levine practiced general internal medicine in the Denver area for many years in a variety of practice settings. He co-founded and developed a large physician group practice. To add to his incredible career, vast experience and legacy, his father, Dr. Philip Levine, is remembered as one of the greatest contributors in transfusion medicine.

Thank you very much, Dr. Levine, for being here with us today. It is truly an immense pleasure and honor for us.

Dr. Mark Levine:

Thank you, Tony.

Tony Casina:

Dr. Levine, we'll kick off the podcast here and the first question is, let's start with a brief journey through the history concerning the beginnings of blood transfusions and what key milestones you consider have marked advances in the transfusion medicine field.

Dr. Mark Levine:

Well, thanks, Tony. The history is very rich, as you can imagine. Even the ancients had some idea that blood was somehow essential to health and wellbeing, and through the pre-history and early recorded history, there were occasional experiments of trying to pass blood from one to another in an attempt to help people not only physically, but sometimes also spiritually and otherwise.

These transfusions even occurred from animals, but they were very primitive in the sense that the only way to transfer the blood for the most part was from one person's vein into the veins of another... From the donor, which could be an animal or another human into a person. Of course today, we are much

more sophisticated than that in that it is not only blood that we use in helping people, but also the components of blood and all of that was very much in the future.

The 19th century really was the beginning of what we would call the modern concept of blood transfusion. The development of syringes enabled people to take blood from one person and put it into another. This kind of transfusion was occasionally successful, was applied to some areas that we now see worth in, such as hemophilia and blood loss from postpartum hemorrhage, for instance, but it was only successful occasionally, perhaps 50% of the time. Repeated transfusions were problematic in that after people had an initial transfusion, a reaction to subsequent transfusions was quite likely.

The major thing that happened to straighten this out was the Nobel Prize-winning work of Karl Landsteiner in 1900, who mixed donor and recipient blood in what we would call now a very primitive form of cross-matching and recognized that there were different factors associated with different people. We now know this as the ABO blood factors. Landsteiner himself then moved to the United States and subsequently discovered several other blood factors, as we will hear as we go on.

The major changes in the early 20th century, however, were also technical. The development of anticoagulants and use of refrigerated blood enabled then people to receive blood that was not just directly transferred but rather done at different points in time. World War I saw huge advances in blood donors and blood banking that began to come into effect. As time went on, we recognized that we could also cause harm with blood transfusions, with the passing of infections, and it wasn't until perhaps the 1930s or thereabouts that people began to be screened for things such as even tuberculosis, malaria, et cetera.

The 1930s were dramatic. The development of the first American blood banks happened at Cook County Hospital. A huge influence upon blood banking was in 1939, when actually by father Philip Levine described an unusual case of hemolytic transfusion reaction in people who were of the same ABO blood type, actually between a mother and father of a child who was affected with erythroblastosis vitalis, which coming from a blood banking family was one of the first phrases that I was taught as I was growing up, erythroblastosis vitalis, also known as hemolytic disease of the newborn, caused by a reaction between the blood of the mother with the antibodies against antigens present in the fetus.

This was later found to be related to an antibody that had the same reactivity as one that was described by injection of human blood into Rhesus monkeys and subsequently became called the Rh factor, which led to some interesting discussions about the naming of the antibody. I think actually one of the most important aspects of transfusion in this period of time was the development of exchange transfusion by Louis Diamond in Boston, who was able to help children who were affected with erythroblastosis vitalis by exchanging their blood with blood that was able to clear the hemolytic products that were in their blood and help to save them.

The other major advance was in 1958, when actually the laboratory at Ortho led by my father published and... My father actually published a paper called The Influence of the ABO System on Rh Hemolytic Disease, which showed that if there was an ABO incompatibility, the incidence of Rh hemolytic disease was much less because the antibodies in the mother's serum would destroy red blood cells that might have crossed the placenta before they had a chance to immunize and cause difficulty.

That insight led directly over the next decade to the development of antiserum against the Rh positive

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blood that would be transferred through at the time of pregnancy and the development of Rh immune globulin RhoGAM, which followed thereafter. As a result of that, this wound up saving hundreds of thousands and perhaps millions of lives since that point in time. Today, blood transfusion is very safe. It is very simple. It is very straightforward. It is very systematized, and it is one of the medical breakthroughs that has saved multiple lives throughout the last century.

Tony Casina:

Thank you for that complete overview and history of the importance of blood from a transfusion perspective. It's a long history, but also a short history same time. Let's continue with the general overview from your perspective about patients and conditions that are impacted by transfusion of blood, plasma and platelets. What population is it that is often in need of frequent transfusion of blood products?

Dr. Mark Levine:

The usual populations are first thought of as those who have inherited disorders such as sickle cell disease or hemophilia thalassemia, and that's not just of blood. It's also of blood product that are derived from the donation of blood. But there are also acquired conditions too, hemorrhage, particularly postpartum hemorrhage, and trauma and things like that. Anemia, cancer, kidney disease, liver disease, severe infections, thrombocytopenia, other forms of clotting disorders besides hemophilia, et cetera. There's a very broad range of medical conditions that require transfusion.

Tony Casina:

Yes. Since the recent COVID-19 pandemic, we have heard much about the deficit in inventory of blood for the blood banks. Continuing the message of how important it is to donate and donate regularly, let's talk from the donor's perspectives. Are there general benefits, theoretical or proven, for donors who are repeat donors?

Dr. Mark Levine:

There are. Some of them are more concrete than others, but there are certainly advantages. If nothing else, the sense of wellbeing and being a member of society and contributing to the wellbeing of others is reflected in self-satisfaction and self-esteem, et cetera. It's been shown that people who donate blood regularly have a lower risk of depression and actually better physical health and a longer life at minimal cost. The process of donation is very simple and straightforward.

Some of the other advantages are, well, number one, may lose a few calories from the... But that's not very much. It's about the rough equivalent of a tasty piece of chocolate, and that's about all. The other thing is that some people donate blood because of the use of blood in a family or a friend, what we call a replacement donation, and that used to actually be fairly common in blood banking, although it's no longer very much of a factor for a variety of reasons.

There are some people who need to donate blood regularly, people particularly who have too much iron in their blood, a condition called hemochromatosis. That's rare, but for those people, donation of blood

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is very important and interesting to note that their blood is safe and is able to be used for transfusion. It's a genetic abnormality and not something that is transmissible through the blood.

There's also a growing literature looking at the population of people who donate and compare them to others. It's difficult research because there's a thing called the donor effect. The people who donate blood generally tend to be a healthier group of people and et cetera, but nevertheless, there is some evidence that donation of blood and particularly reducing the circulation of the amount of iron in the body can have some benefit. Cardiovascular disease and hypertension are thought to be lower in people who donate regularly, particularly cardiovascular disease in women.

There's also some recent evidence that there are certain what we call forever chemicals that can be in the body and are associated with various diseases including cancer and cardiovascular disease, and that these appear to be lower in people who donate blood regularly. Although the threat of these forever chemicals has been reduced in recent years as there's been much more attention to these and they're not as available in the environment as they used to be, the relative effect of that is small.

There's also some recent attention to cancer. There are some cancers that appear to be dependent upon their growth at least, is dependent upon the availability of iron. Regular donation reduces the amount of iron in the body, not to critical levels, but to some degree, and that has been shown to have some effect upon cancers. The clinical impact of that appears to be marginal at best, but it is a sign of something that many people are studying now to understand the relationship between iron metabolism and cancer and the effect of regular blood donation.

But one of the most important benefits of regular donation is the support of people. Some people give because of the need of a family or a friend who has received transfusion and they wish to repay the blood bank. That's a feeling of self-sacrifice and donation that many people value very much. People who donate regularly are shown to be a population of people who are more selfless than others and more willing to contribute to the common good.

Tony Casina:

Thank you. The topic of the iron accumulations, there is a published paper in the Journal of National Cancer Institute reviewing the link between repeat donors having lower risk for some of the cancers like liver, lung, colon, stomach, and throat cancers. I appreciate you taking the time to review that with us, because I think that's significant information from the standpoint of something that could be of value to those out there as donors to understand that they may be reducing their risks for cancer.

Dr. Mark Levine:

Unfortunately, that study has not yet been replicated and is still not quite definitive, but it is certainly raising the possibility that that's correct.

Tony Casina:

Right. Okay, great. Well, just to end this very interesting conversation that we've had so far, Dr. Levine, what would your message be to our listeners to encourage them to go to the nearest donor center and book an appointment today to donate?

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Dr. Mark Levine:

My message to them would be to do that, to donate once, to realize how good it makes you feel, and then to donate again and again. It's a very worthwhile thing. I've donated multiple times through my life, and it's always a good feeling to walk out feeling that you have contributed to the common good.

Tony Casina:

Thank you, that is a fantastic message for the donors out there that are considering donating and those that routinely donate.

Thank you very much, Dr. Levine. I really want to thank you for taking the time with us today and giving us your experiences and insights on this fascinating topic. Thank you so much for your time today on this podcast. It has been truly an honor to talk with you about the importance of donating blood and more importantly, to become a repeat donor. Thank you, Dr. Levine.

Dr. Mark Levine:

Thank you for the opportunity to contribute.

Tony Casina:

I hope you all have enjoyed this podcast episode about the benefits of becoming a repeat blood donor and a positive impact in health and for the community. Make sure to review the sections within the podcast description for any reading materials that we've suggested. Based on today's podcast, I'll leave you with our pop quiz. What is the interaction between donating blood and levels of iron? You can always go back and listen again. Thank you for listening, and please subscribe to QuidelOrtho Science Bytes, brought to you by Quidel Ortho Corporation, where we are transforming the power of diagnostics into a healthier future for all. Take care. Stay healthy and safe.

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