VELANO VASCULAR:
NEEDLELESS BLOOD DRAW TECHNOLOGY RELIEVES
ANXIETY FOR PATIENTS, PRACTITIONERS, AND HOSPITALS

In the US alone, there are more than 300 million inpatient blood draws annually, which still largely involve sticking a patient with a needle several times a day. Velano Vascular is making use of the IV catheter that 90-95% of hospital inpatients already have in place, to provide a needle-free blood draw technology that offers comfort, safety, and workflow advantages.

One of the most common procedures in hospitals around the world, drawing blood is still done the old-fashioned way, but it’s not necessarily tried-and-true because it causes discomfort, anxiety, and safety risks for patients, practitioners, and hospitals. There are 300 million inpatient blood draws annually in the US alone, a procedure that still largely involves sticking a patient with a needle and drawing blood via either evacuated tubes or a syringe. According to data gathered by start-up Velano Vascular Inc., one out of every three hospital patients is stuck two or more times daily throughout their hospital stay. A significant number of them receive three or more blood draws per day. Moreover, 28% of adult venipunctures and 44% of pediatric venipunctures require more than one stick to successfully draw blood. It’s probably the largest source of dissatisfaction among patients, who don’t tend to dwell on postoperative pain as much as the discomfort of being woken up nightly to be stuck with a needle. Black and blue bruised arms are a constant reminder of this sore spot in patient care. Eric Stone, co-founder of Velano Vascular should know; as a teen, he was a hospital inpatient because of a flare-up of Crohn’s Disease. “I spent almost two weeks at Rainbow Babies and Children’s Hospital in Cleveland, and my most visceral memories were not the agonizing gut pain, not the absence of food for 8-10 days, it was the 4 and 5 AM blood draws.”

That’s the patient’s perspective. The nurses and physicians that care for patients have another source of anxiety: accidental needle sticks. Blood-draw related needle-stick injuries account for 13-20% of total needle-stick injuries, a risk and a fear health care providers live with every single day of their careers. Two out of three nurses report experiencing at least one accidental needle stick in the course of their careers. Stone notes that one of Velano Vascular’s advisory board members contracted HIV and hepatitis C from a needle stick after 26 years as a nurse.

Stone is an experienced medical device executive who helped launch the world’s first bioabsorbable stent for Abbott Laboratories, and most recently served as VP of sales and marketing for a precision medicine company. To solve the blood-draw problem, he teamed up with Pitou Devgon, an MD with an MBA from Wharton. In the course of his practice as a hospitalist, Devgon had come to a similar awareness of the need to change the blood-draw paradigm. Stone says that it was a particular elderly female patient who Devgon met during his residency that sparked an innovative solution. “She pointed to the catheter in her arm,” he reports, “and asked ‘Why are you sticking me repeatedly in my other arm to draw blood when I have this thing?’”

That’s exactly what Velano Vascular set out to do. “Our technology follows this premise: if you enter the hospital in the ER or onto a floor, one of the first things that happens is that a peripheral IV is placed in your hand or arm.” Stone estimates that 90% or more of hospital inpatients around the world have an IV inserted for the purpose of infusing drugs or fluids should it become necessary. They haven’t been used to withdraw blood, however. The current IV technologies use soft plastic that’s optimized for dwell time, and aren’t, on their own, useful for withdrawing blood since negative pressure makes them kink and collapse. “That is one of their failure
modes, the other is platelet and fibrin tails—debris that accumulates over time at the end of the IV tube. If you draw back on the tube, it will either collapse or the debris will act as a ball valve, entering and blocking the end of the IV.” Velano’s technology, which takes the approach of a tube within a tube, solves those problems, according to Stone.

“Our technology today looks a bit like a syringe. You attach it to the extension set on a peripheral IV and push a plunger at the back of our device, which advances a very small, soft catheter through the peripheral IV that is already in the vein. It uncollapses or uninks the IV, moves just past the end of the IV and emerges slightly into the vein, past any debris that has built up. Then a practitioner can use standard blood tubes to withdraw blood.” It’s a single-use disposable that dwells in the IV only for the brief amount of time that it takes to gather the necessary vials of blood. When the blood-draw is complete, “You retract the plunger, unattach and dispose of the device. If you had an infusion going, you flush the line and turn the infusion back on.” On the back-end, says Stone, the workflow is the same as the common butterfly needle used to withdraw blood. Except, he continues, “patients are no longer awoken at 4 or 5 AM to get stuck with a needle. We know that sleep affects healing and that disturbance of sleep affects both healing and patient satisfaction.”

The needleless approach brings many other potential advantages. The elderly, the obese, and people with diabetes represent the fastest growing inpatient populations, and these tend to be difficult venous access patients. “It is difficult to get access with a needle, it takes more time, more money, more needles to get that blood draw.”

Velano’s first-generation device has 510(k) clearance from the FDA and recently, in June 2015, gained the CE mark. Now the company is in the midst of clinical studies and plans to do early commercial pilots later this year, in preparation for broader commercialization, which brings some manufacturing challenges. “Think about it. If there are 300 million inpatient blood draws in the US every year and we want to capture a one-percent market share, we will be making three million units, and that is no small feat.” But Stone notes that Velano has assembled a team that has done just that for very large companies before.

Velano isn’t discussing pricing just yet, but its device will obviously be some order of magnitude more costly than a $.75 needle, times more than 3 million units. Will that cause concern for hospitals?

“That’s the question we are answering,” he replies. “But why even start with the cost of the needle? Is that even the largest percentage bucket in the cost of a blood draw? Not at all.” The data that show the true cost of blood draws aren’t transparent or clear to the health system just yet, says Stone, and quantifying that cost is part of the company’s ongoing work. “There are 30 different economic inputs to today’s blood draw procedures, from materials and labor to the indirect or intangibles like patient experience, practitioner workplace anxiety, safety, delays in diagnosis, or the costs and risks of blood draws off of a central-line or PICC [peripherally-inserted central catheter] line.” In that case, notes Stone, you have a $300 device placed under ultrasound guidance by a physician or infusion nurse specialist. “That sets the baseline for today’s cost structure in blood draws. The needle may be $.75-1.25, but we could show you eventually that you are spending $20, $30, or perhaps even $40 on every blood draw, fully loaded.”

The second part of the company’s challenge is demonstrating the additional efficiencies and cost-benefits associated with its device. “There is another approach to drawing blood today, which is off of the IV directly. That is usually done in the ER when the IV is first placed, but the laboratory will often ask for a second sample, because red blood cells will be torn or sheared and not of diagnostic quality.” Then the patient will be stuck with a needle for that second sample. “How do you measure the cost of that delay in diagnosis, in treatment, in discharge?” The company is working to further assess and quantify these costs and benefits with hospital partners by leveraging expertise from among its investors and advisory board—it has a partnership with Brigham and Women’s Hospital, for example. Armed with this kind of data, Velano hopes to have arguments that will resonate with patients, payors, hospitals, and all the stakeholders in healthcare.

In January 2015, Velano Vascular raised a $5 million Series A round from a group of largely non-traditional medtech investors, including First Round Capital, the first health care investment for the fund, known for their investment in Uber and other popular companies; Kapor Capital, whose founder Mitch Kapor founded Lotus Development Corporation; and White Owl Capital, which has investments in renewable energy, infrastructure, and healthcare/project financing. Additional participation in the round came from Safeguard Sciences, a publicly traded company that provides growth capital for life sciences companies (where, as noted, Devgon was previously an executive), and two hospitals: Griffin Hospital (CT) and The Children’s Hospital, Philadelphia. A number of angel investors, all with deep healthcare experience, also came in on the round.

So many nontraditional investors were drawn to the start-up because it’s an enormous market and a solution that’s easy to understand. Stone says, “Just about everyone has, or will be an inpatient in a hospital at some point in their lives. When we show the technology to someone, there is an almost visceral reaction to the lived experience.” Ultimately, he says, it comes back to the company’s philosophy, more than the technology itself. “They get the human component. A patient and a doctor have teamed up to bring compassion into care.”