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CORRESPONDENCE

An improvised pressurization system for arterial lines

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To the Editor,

Most transducers used to provide invasive arterial blood pressure (BP) monitoring require a pressurized supply of saline to ensure the transducer functions appropriately and to maintain a consistent flow of saline at the cannula tip to prevent the system from clotting. Pressurizing the system is typically achieved using a pressure bag (inflatable pressure cuff on a bag of saline). However, there are certain situations when a pressure bag may be unavailable or may malfunction without a backup. Such circumstances could include low-resource settings, non-operating room/non-intensive care unit settings, during patient transport, or at an off-site/out-of-hospital facility.

We describe a method for retrofitting commonly available medical equipment that can be used in place of a pressure bag for the invasive BP monitoring setup.

The basic supplies required include a syringe, elastic tourniquet, medical tape, and saline. The steps for retrofitting are as follows: First, attach a saline-filled syringe to the proximal (i.e., pressure bag) side of the transducer. Next, tape the tourniquet to the barrel of the syringe and stretch it over the plunger such that the tourniquet is under tension. The elastic recoil of the tourniquet pressurizes the system (Figure A). This most simplistic form of retrofit will work effectively to maintain the invasive BP setup. This system can be made more sophisticated by attaching a three-way stopcock between the syringe-tourniquet setup and the transducer. This approach allows for the pressurized syringe to be refilled without detaching it from the system (Figure B).

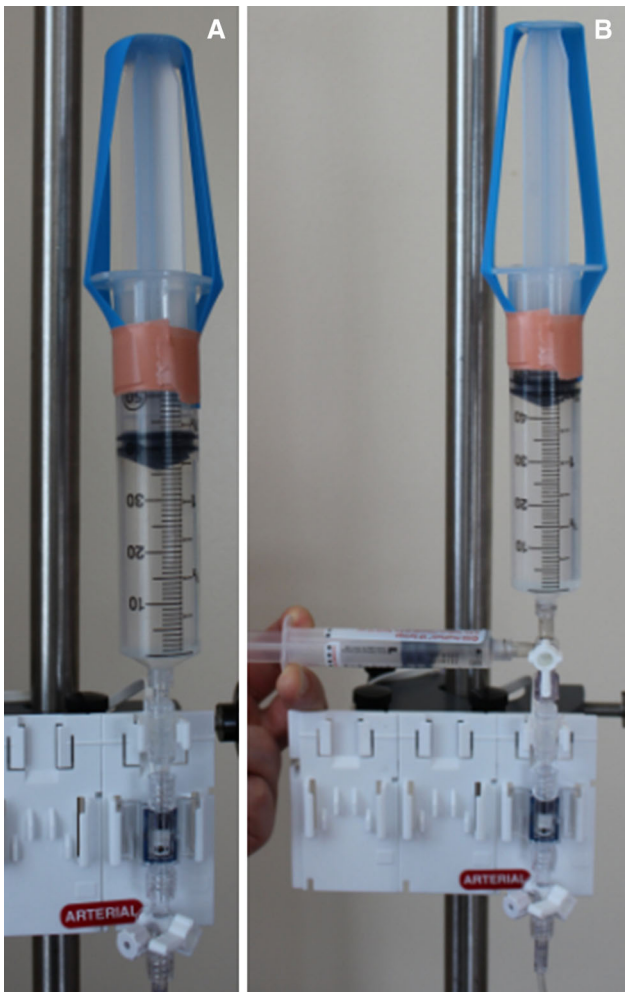

Figure A) Syringe-tourniquet pressure system attached to the "pressure bag" end of the pressure transducer. B) Three-way stopcock implemented to allow refilling of the syringe-tourniquet pressure system

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Most pressure bags are equipped with a pressure gauge that allows quantifying the pressure in the system. In this case, a digital measurement of the syringe pressure can be monitored directly by closing the three-way stopcock and occluding the side port of the stopcock with a plug so it is not open to the atmosphere. Frequently re-measuring this pressure will help to ensure that the syringe pressure does not fall below approximately 300 mmHg, as this could lead to a loss of catheter patency and to clotting. As long as the volume of fluid in the syringe is kept within a few millilitres of the starting volume by occasionally refilling the system, it will maintain the appropriate pressure to ensure that the invasive BP monitoring system functions appropriately.

We do not advocate using this system in place of a conventional pressure bag. Rather, we are describing a practical solution to overcome the problem when no pressure bag is available. Furthermore, this retrofit requires no intravenous tubing, which makes it less bulky and cumbersome than a pressure bag. Finally, the low-cost supplies required also make it a cost-effective alternative.

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Conflicts of interest None declared.

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