

A Sequential Compression Mechanical Pump to Prevent Hypotension during Elective Cesarean Section under Spinal Anesthesia

Nambiath Sujata*

Department of Anesthesiology and Pain Management, Max Hospital, Saket, New Delhi, India

*Corresponding author: Nambiath Sujata, Department of Anesthesiology and Pain Management, Max Hospital, Saket, New Delhi, India, E-mail: drnambiath@yahoo.com

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Elective Cesarean Section under Spinal Anesthesia

In the study (2012), it was shown that sequential compression mechanical pumps with compression cycles timed to venous refilling decreases the incidence of hypotension after spinal anesthesia by recruiting pooled venous blood from the lower limbs and maintaining central blood volume [1,2]. The SCD EXPRESS[®] Compression System Controller (Covidien, Mansfield, MA, USA) was the pump used in the study. The pump prevents pooling of blood in the lower limbs by producing circumferential compressions and decompressions at present pressures. The compression cycles were timed to the patients venous refilling. This made it more efficient in moving to the central compartment the peripheral pooled blood, and thus gave it a major advantage over the other pumps that were in use at that time [3].

Since then many other compression pumps have come into the market.

The Jobst 7500 Extremity Pump has three independent inflation segments that alternately fill and deflate, pushing the blood supply through the veins and arteries in the extremity. There is optional sequential adaptor tubing and an additional sleeve for compression of both the extremities together.

The Kendall AV Impulse Foot Pump uses a foot sleeve with a rigid base that fills with air and then deflates in a programmed cycle, simulating the blood flow in the plantar plexus. A display constantly monitors the current pressure in mmHg, cycle time and has a graphic display that indicates the current inflation conditions.

The Nutech Plexipulse is a pneumatic sequential compression device used on the calf and the foot. The frequency, intensity and duration of air bladder inflation and release can be controlled. The Plexipulse can deliver air pressure to the right foot, the left foot, or both feet at the same time.

Both the Kendall foot pump and the Nutech Plexipulse return only the blood from the foot and calf. While this may be enough to provide mechanical prophylaxis against deep vein thrombosis, the amount of blood squeezed back into the central compartment may be insufficient to maintain the blood pressure in cases of spinal anesthesia induced hypotension [4]. The Jobst pump provides compression of the thigh as well, and so may be more efficient than the other two pumps in maintaining the blood pressure.

The authors believe that the SCD EXPRESS[®] Compression System Controller may still be superior to all the other pumps currently available because this is the only pump that detects venous refilling and cycles accordingly.

Further studies comparing the ability of the different pumps in preventing spinal anesthesia induced hypotension would be interesting.

References

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