Abstract:

OBJECTIVE: Syringe drivers are the principle method of giving small-volume continuous infusions of important drugs to patients. Many of these drugs are critical for the maintenance of normal physiology. Anecdotal evidence abounds of severe patient instability on movement of syringe drivers during infusion. We aimed to define the variation in drug delivery seen in three syringe drivers, with changes in relative height between the syringe driver and the end of the giving set.

DESIGN: Three syringe drivers (Alaris CC , Perfusor Space , and Synamed µSP6000) were analyzed for reliability of flow at 0.5, 1, 2, and 5 mL/h.

SETTING AND SUBJECTS: This is an in vitro investigation.

INTERVENTIONS: A small air bubble was introduced into the giving set, and the progression of this was documented before and after a vertical movement of the syringe driver by 25 or 50 cm upward or downward relative to the delivery port.

MEASUREMENTS AND MAIN RESULTS: For all pumps, delivery was interrupted on movement of the pumps downward, and a bolus was given with movement of the pump upward. Delivery halted at lower pump speeds for longer than higher pump speeds. The maximum delivery interruption was 11.8 minutes. Boluses given on moving the pump up were calculated as the equivalent number of minutes needed to deliver the bolus volume at steady state. The maximum bolus given was equivalent to 15.8 minutes of delivery. We were unable to eliminate the effects seen by very slow, steady movement of the pumps up or down. Static height differences made no difference to delivery.

CONCLUSIONS: Syringe drivers should not be moved vertically in relation to the patient. Critical drug delivery is interrupted for up to 12 minutes with relative downward movements, and significant boluses of drugs are given with relative upward movements. As far as possible, elimination of relative height movements is advised, and extreme caution is necessary if any movements are unavoidable.

Reference:

Zahid, A., Raffaj, D., Wignell, A. and Davies, P. (2020) Continuous Drug Delivery is Significantly Affected by Relative Height Changes Between Patient and Syringe Driver. Journal of Patient Safety. March 12th. doi: 10.1097/PTS.0000000000000645. (Epub ahead of print).