

# An assessment of the performance of the Baxter Elastomeric Large Volume (LV 10) Infusor pump under hyperbaric conditions

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## Background

- Hyperbaric oxygen treatment is often used in conjunction with long term intravenous (IV) antibiotic therapy.
- Historically, infusion pumps have been disconnected from patients before hyperbaric treatment.
- The Baxter elastomeric LV 10 infusion device (Figure 1) allows for 24 hour (hr) continuous IV drug delivery. Because it is balloon (not electrically) driven, theoretically it can be used during hyperbaric treatments.
- Whether the hyperbaric environment affects the flow rate of elastomeric infusion devices is unknown.



Figure 1: Baxter elastomeric LV10 infusor pump



Figure 2: Participant with pump set-up attached

## Aim

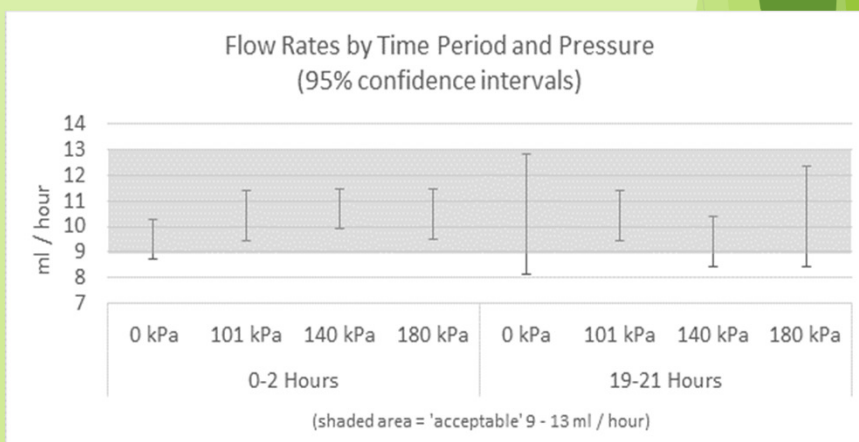
- Assess the flow rate of the Baxter elastomeric LV 10 infusor pump under common hyperbaric treatment pressures.

## Methodology

- All test antibiotic infusions were diluted in 0.9% Sodium Chloride (expected flow rate 11ml/hr +/- 10%).
- Pumps were secured to participants in the same manner as a typical patient (Figure 2). The luer lock was attached to the participant's arm to achieve optimum temperature (31.1 °C).
- Pumps were tested at 0 (sea level), 101, 140 and 180 kilopascals (kPa) at 0-2 hours (beginning of infusion) and 19-21 hours (towards the end of infusion).
- Pumps were weighed before and after each test to determine delivered volume (1mg = 1ml).
- An a-prior sample size estimate indicated 5 pumps in each group would provide greater than 90% power ( $\alpha = 0.05$ ) to detect a clinically significant 20% (2.2 ml/hr) difference in observed versus expected flow rates.

## Results

- Mean flow rates ranged from 9.4 +/- 0.4 ml/hr to 10.7 +/- 0.4 ml/hr.
- Only two observed flow rates differed by more than 20% of the expected flow rate.
- Two-factor ANOVA demonstrated no statistically significant difference in flow rates for the four pressure groups ( $F=0.18$ ,  $p=0.671$ ) or the two time periods ( $F=0.061$ ,  $p=0.611$ ).
- The 95% confidence intervals for the mean flow rates at different ambient pressures are shown in Figure 3.



## Conclusions

- The flow rate of the Baxter elastomeric LV 10 infusor pump was not significantly affected by increased ambient pressure.
- Baxter elastomeric LV 10 infusor pumps can be safely used to administer antibiotics in hyperbaric chambers.
- Further research is needed to investigate the effect drug choice and dose/concentration may have on flow rate.

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