Comparison of Saline Utilized with the DualWave Arthroscopy Pump System using an Inflow Only and Combination Inflow/Outflow Configuration

Arthrex Research and Development

Objective

Compare amounts of saline utilized by the DualWave Arthroscopy Pump System when inflow only and combination inflow/outflow lines are used.

Methods and Materials

Table 1. Equipment used to perform saline fluid utilization test

AR-6480 DualWave Arthroscopy Pump	AR-3371-4000 Scope Sheath
AR-8305 Shaver System	AR-3350-4030 Arthroscope
AR-8330H Shaver HandPiece	AR-3032-5.5 Cannula
AR-8550DS 5.5 mm Shaver Blade	AR-3035L Cannula Adapter w/ Stopcock
AR-6411 Inflow Tubing	HUMM-VAC (Part#HPV12) Vacuum Pump
AR-6340 Outflow Tubing	Omega Engineering Commercial Grade Vacuum

Items listed above were assembled in a standard arthroscopy fashion with scope sheath, cannula, and shaver blade inserted into an acrylic joint simulation model to contain the fluid. Tubing was assembled according to the instructions for use and the DualWave was at a height level with the acrylic joint model.

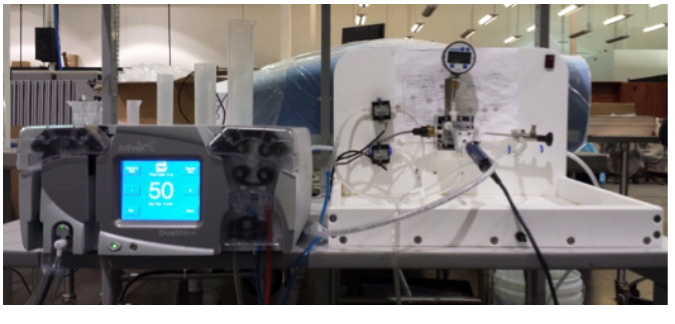

Figure 1. Set-up used for testing saline utilization

To ascertain the total fluid used, onboard fluid usage monitoring capabilities on the DualWave were utilized. It supplies real-time data of the fluid rate while running and when stopped, the DualWave will display the total fluid used. The DualWave was turned off between each individual test to fully reset the fluid usage monitor.

Two different configurations were evaluated for the amount of saline utilized during the following sequence of operation for each configuration:

1) Run pump at 50 mmHg for 2 minutes with no shaver activation
2) Active and run shaver for 2 minutes
3) Deactivate shaver and continue running the pump for 1 minute

Set-up for each of the two configurations is outlined below:

Set-up 1:
- Utilized a standard set-up of inflow tubing on the DualWave. The vacuum pump was set to -12 inHg and attached to the shaver handpiece.
- The DualWave was set to a pressure of 50 mmHg.
- The suction value of -12 inHg was chosen based upon a user survey of the preferred settings of their Stryker Neptune suction devices which allow the users to select different levels of suction. Most users reporting fell into a range of -8 to -12 inHg.

Set-up 2:
- Utilized a standard set-up of inflow tubing on the DualWave and a standard set-up of outflow tubing with the shaver suction tubing attached to the shaver hand piece.
- The DualWave was set to a pressure of 50 mmHg with shaver suction set to Medium. Cannula tubing was not utilized in this set-up.

Results

Mean and standard deviation values for amounts of saline utilized by the DualWave Arthroscopy Pump System when inflow only and combination inflow/outflow lines used are displayed below in Table 2.

Table 2. Saline utilization results using Inflow Only and inflow/outflow lines

Saline Utilization Results		
	Inflow Only (mL)	Inflow and Outflow (mL)
Sample 1	1144	930
Sample 2	1124	874
Sample 3	1118	921
Mean	1129	908
St. Dev.	14	30

Conclusion

A significant amount of saline can be conserved (approx. 221mL or 20%) by using a combination inflow and outflow lines on the DualWave Arthroscopy Pump System at the proper settings.