

Q5 WHAT IS THE MOST EFFECTIVE WAY OF TREATING VOLUME OVERLOAD THROUGH PD IN THIS CASE?

- A. 9 hours overnight with five 2.3L cycles of 4.25% dextrose plus last fill of 7.5% icodextrin
- B. 11 hours overnight with six 2.3L cycles of 2.5% dextrose plus a last fill AND subsequent manual exchange of 2L 2.5% dextrose
- C. 9 hours overnight with five 2.3L cycles of 7.5% icodextrin

The correct answer is A.

The key concept in this question is to understand the ultrafiltration rates of different solutions. Being that 4.25% dextrose has the highest osmolarity it will generate the strongest concentration gradient and maintain the gradient for the longest time. This will result in both the fastest ultrafiltration rate and the most ultrafiltration over a given period of time.

Choice B will achieve additional ultrafiltration by the addition of the 6<sup>th</sup> overnight cycle as well as the additional manual exchange. However, this will most likely still be less total ultrafiltration than choice A.

7.5% icodextrin is a starch colloid, and only has an osmolarity of 282 mOsmol/L. The "7.5%" is misleading, and this number should not be compared to 1.5%, 2.5%, and 4.25%, because the latter three are dextrose concentrations.

In addition, dextrose solutions immediately activate peritoneal aquaporins channels which result in a sharp ultrafiltration rate. On the contrary, icodextrin does not activate aquaporins, so the ultrafiltration is slower and more gradual. Clinically, this means icodextrin dwells NEED to be long to achieve appropriate ultrafiltration (see figure below). Its concentration is generally preserved because it is not reabsorbed systemically through the peritoneal capillaries.

