

Q2. WHAT IS THE BEST ADJUSTMENT TO MAKE TO ACCOMMODATE FOUR DAYS PER WEEK?

- A. No further change, just decrease to four days
- B. Increase Vd to 35 L
- C. Decrease FF to 0.3
- D. Increase Qb to 450 ml/min

The correct answer is B.

The first key point in this example is to highlight the need to preserve small solute clearance when decrease the number of days per week. The second key point is to understand which variables can be adjusted.

On a 5 day/week regimen, she has a spKt/V of 0.7 to achieve a weekly standard Kt/V of 2.1.

If she is on 4 days without any other modification to prescription, then her weekly standard Kt/V will be around 1.7 which is below goal.

In order to increase adequacy, she will need either 1.) exposure to more dialysate, or 2.) higher dialysate saturation.

The former is achieved by simply increasing the Vd. If the Vd is increased from 30 to 35 L while keeping the FF at 0.5, her spKt/V =  $(0.9)(35 \text{ L}) / (0.5 \cdot 70 \text{ L}) = 0.9$ . Based on the relationship between spKt/V, standard Kt/V and treatments per week, this change would result in a weekly standard Kt/V near 2.1.

An important thing to note is the length per treatment will increase. Previously the length of treatment was 2.5 hours =  $(30,000 \text{ ml}) / (200 \text{ ml/min})$ . With the Vd at 35 L, the new time will be 2.92 hours =  $(35,000 \text{ ml}) / (200 \text{ ml/min})$ .

The other way to increase adequacy is by decrease the flow fraction to raise dialysate saturation. If the FF is decreased from 0.5 to 0.3 the new dialysate saturation will rise from 85% to 93%. It is important to note that decreasing the flow fraction further results in diminishing return in saturation as it will approach a horizontal asymptote. The new spKt/V with a FF of 0.3 will be  $(0.93)(30 \text{ L}) / (0.5 \cdot 70 \text{ L}) = 0.80$ . This change will not be enough to raise the standard Kt/V to at least 2.1. If the FF is reduced further to 0.2 (95% saturation), the new spKt/V will only be 0.81.

As with increasing Vd, reducing FF will also result in greater time per HD session.

Reducing the FF to 0.3 will result in a time of 4.17 hours, and FF 0.2 will be 6.25 hours!

This example shows how much more efficient clearance is increased by increasing Vd as opposed to decreasing FF. The only downside is increasing Vd will utilize more water.

Additional Reading:

<https://www.nxstage.com/wp-content/uploads/2019/08/Dialysate-Volume-Quick-Reference-Guide.pdf>

<https://www.nxstage.com/wp-content/uploads/2017/08/NxStage-Therapy-Handbook-APM907.pdf>