Wall Supply Boxes: A Risk for Patient Health and Safety

Glenda Payne

Review of:

Novosad, S.A., Lake, J., Nguyen, D., Soda, E., Moulton-Meissner, H., Pho, M.T., ... Patel, P.R. (2019). Multicenter outbreak of gram-negative bloodstream infections in hemodialysis patients. *American Journal of Kidney Diseases, 74*(5), 610-619. doi:10.1053/j.ajkd.2019.05.012

A very important article was recently published in the *American Journal of Kidney Diseases*. The article describes an outbreak investigation by the Centers for Disease Control and Prevention (CDC). CDC scientists identified the outbreak from routine surveillance data required to be submitted via the National Healthcare Safety Network (NHSN). A dialysis facility reported bloodstream infections (BSIs) and listed water-borne organisms in culture results. Seeing these organisms as causative led the CDC to notify the applicable state health department and sparked an invitation from the state for CDC to assist with the investigation.

Findings

What they found has enormous relevance to the health and safety of all patients on in-center hemodialysis. At the three facilities included in this outbreak investigation, more than 50 patients were affected, with 83% being hospitalized for a median length of stay of 8 days. Most patients with a BSI had central venous catheters (CVCs) as their dialysis vascular access. Organisms found most often were *Serratia marcescens* ($n = 21$) and *Pseudomonas aeruginosa* ($n = 12$).

CDC investigators cultured the fluid residue in wall boxes (see Figure 1) and found evidence of the same organisms that caused the BSI in some patients. Further, CDC observations of staff practices found staff occasionally handled the acid concentrate connections (e.g., switching from a 2 mEq/L (2K) to 3 mEq/L (3K) without changing gloves before connecting a patient's CVC to the extracorporeal circuit.

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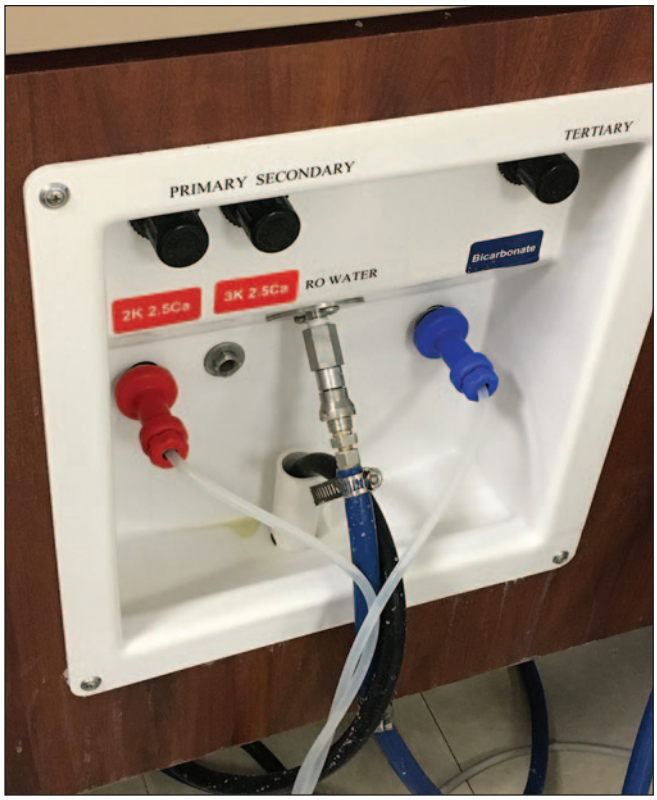
Figure 1
Wall Box



Source: Courtesy of Matthew Ardvino, Centers for Disease Control and Prevention.

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While there has been tremendous emphasis on separating "clean" and "dirty" areas and tasks elsewhere in dialysis facilities, we have not previously considered the close proximity without separation of clean and dirty fluids in the wall boxes. Wall boxes recessed into the wall at each dialysis station serve to house the connections for the supply for "clean" purified water and dialysate concentrates, and a connection to the drain line for "dirty" spent dialysate. Anyone who has worked in dialysis very long has seen fluid residue, back-up, foaming, and even "drain flies" in the wall boxes. Generally, the clean side of the wall box (i.e., the supply lines for purified water and dialysate concentrates) is not separated from the dirty side (i.e., the waste line and drain).

Protecting Patients

Suggestions made by the investigators to protect patients from this source of infection include:

- Educate staff on risks associated with wall boxes.
- Emphasize the need for hand hygiene after any contact with the wall box or any of its components (e.g., concentrate supply lines, the drain line).
- Routinely clean and disinfect wall boxes at least daily to include the connections for acid, bicarbonate, and water.
- Discard wipes used to clean the wall box after use; do not use these wipes to clean other surfaces.
- Take immediate steps to address any malfunction at the wall box (e.g., clogging, foaming, back up of waste fluid).
- Conduct routine surveillance for health care-associated infections and review results. Blood cultures positive for gram-negative organisms commonly found in water-related biofilms should prompt investigation into possible reservoirs, including wall boxes. Contact local or state health departments for help in such investigations.
- If foaming or splashing is a continuing problem, alternate wall box designs that separate clean/dirty should be considered.
- New dialysis facilities should consider installing wall boxes that separate the clean supply lines from the waste drain.

For more information on this topic, visit https://www.cdc.gov/dialysis/guidelines/wall-boxes.html