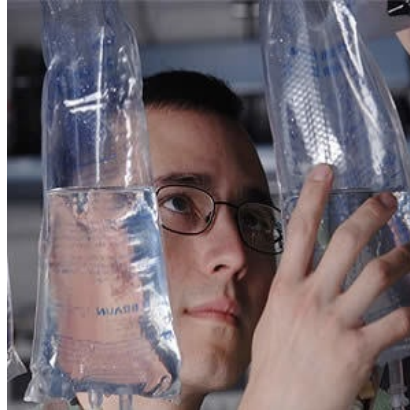




## Fluid Challenge: Its Impact on Fluid Responsiveness



The fluid challenge is considered the gold standard for diagnosis of fluid responsiveness. A new systematic review finds that the duration of the fluid infusion in a fluid challenge has a significant influence on fluid responsiveness – i.e., a rapid infusion increases the proportion of patients with a positive response. However, the type and volume of fluid or the time of assessment does not appear to have any effect on the detection of fluid responders.

"Currently, no consensus exists on how to perform an effective fluid challenge. This study highlights the need for a standardised technique for research and clinical purposes," according to study authors. Their findings are published in the journal *Critical Care*.

Fluid challenge is one of the commonest interventions in critical care medicine. This involves the infusion of a specific amount of intravenous fluid to assess ventricular preload reserve and subsequent systemic haemodynamic effects. The volume of fluid infused must be sufficient to increase right ventricular diastolic volume and subsequently stroke volume (SV) as described by the Frank-Starling law. Fluid responsiveness is conventionally defined as an increase of at least 10% to 15% in SV in response to a fluid challenge, which is a reflection of the limits of precision of the technology used. Patients who reach this threshold are considered 'fluid responders'.

Administration of a fluid challenge is not a standardised technique, with varying volumes, infusion rates, fluid types and durations of response. The use of different methods to estimate SV is a further confounder. The current study aimed to describe the different fluid challenge techniques used in clinical trials by assessing fluid responsiveness and how the proportion of patients deemed 'fluid-responsive' varies according to the technique used.

The review team searched MEDLINE and Embase for studies using the fluid challenge as a test of cardiac preload with a description of the technique, a reported definition of fluid responsiveness and the proportion of 'responders' (PR). The primary outcome was the mean PR, depending on volume of fluid, type of fluids, rate of infusion and time of assessment.

A total of 85 studies (3,601 patients) were included in the analysis. The PR were 54.4% where <500 ml was administered, 57.2% where 500 ml was administered and 60.5% where >500 ml was administered. The PR was not affected by type of fluid. The PR was similar among patients administered a fluid challenge for <15 minutes and for 15-30 minutes. Where the infusion time was  $\geq 30$  minutes, there was a lower PR of 49.9%. Response was assessed at the end of fluid challenge, between 1 and 10 minutes, and >10 minutes after the fluid

challenge. The proportions of responders were 53.9%, 57.7% and 52.3%, respectively.

"The total volume of fluid administered to determine fluid responsiveness varies widely, from 4 to 20 ml/kg or 100 to 1,000 ml. Whilst fluid challenge with larger volumes may have serious clinical consequences, such as pulmonary oedema, very small volumes may not represent a cardiovascular challenge. The clinical challenge lies in determining the optimal volume of fluid required to optimise cardiac performance and tissue perfusion," the authors note.

Source: [Critical Care](#)

Image Credit: [US Air Force](#)

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