

Optimization of Blood Sampling Volumes in Cardiac Catheterization Procedures

Kardiyak Kateterizasyon İşlemlerinde Kan Örnekleme Hacimlerinin Optimizasyonu

To the Editor,

The Fick method remains the cornerstone for measuring cardiac output and detecting shunts during cardiac catheterization procedures. Accurate determination of blood flow requires sampling from various locations within the cardiovascular system. To obtain a precise blood sample from a specific chamber, it is customary to discard a certain volume of blood between sampling different sites. This practice ensures that the sample reflects the chamber under consideration without contamination from previous samples. However, the volume of blood discarded can sometimes be excessive, particularly in the context of shunt calculations and in pediatric patients. To address this issue, we conducted a practical experiment to determine the minimal specific volume necessary for accurate sampling.

We prepared a 500 mg/dL¹ dextrose solution by mixing 100 mL of 5% dextrose with distilled water and confirmed the concentration using a glucometer. Several catheters of varying sizes, including a 110 cm 7F Swan-Ganz catheter (Edwards Lifesciences, Irvine, CA, USA), a 110 cm 6F Swan-Ganz catheter (Edwards Lifesciences, Irvine, CA, USA), a 100 cm 6 French (F) Multipurpose A (Alvision, Alvimedica, Türkiye), a 100 cm 6F Judkins right 4.0 (Alvision, Alvimedica, Türkiye), a 110 cm 6F pig-tail (Shunmei, Shenzhen, China), a 110 cm 5F pig-tail (Alvision, Alvimedica, Türkiye), a 100 cm 4F Judkins right 4.0 (Cordis, Miami Lakes, FL, USA), and a 110 cm 4F pig-tail (Cordis, Miami Lakes, FL, USA), were flushed with isotonic saline solution and then aspirated fluid from the prepared solution in 1 mL increments. The glucose concentration of the aspirated fluid was determined using a point-of-care glucometer (Accu-Check, Roche Diagnostics, Germany).

All 7, 6, and 5F catheters and the distal port of the Swan-Ganz catheters reached the desired concentration of 500 mg/dL¹ in 3 mL, whereas 4F catheters and the proximal port of the 7F Swan-Ganz catheter achieved this concentration in 2 mL.

Based on our findings, we conclude that discarding a 3 mL blood sample is sufficient to prevent mixing from previous chamber sampling and to ensure that the sample accurately reflects the chamber under consideration. This optimized volume can help minimize blood loss, especially in pediatric patients and during shunt calculations, thereby improving the efficiency and safety of cardiac catheterization procedures.

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LETTER TO THE EDITOR EDİTÖRE MEKTUP

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