ARTERIAL PUNCTURE
Supporting information

This guideline has been prepared with reference to the following:

Patout M, Lamia B, Lhuillier E et al. A Randomized Controlled Trial on the Effect of Needle Gauge on the Pain and Anxiety Experienced during Radial Arterial Puncture. PLoS One. 2015;10:e0139432

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4583403/

How quickly should blood be analysed post-sample?

A 2021 prospective longitudinal observational study carried out with gasometric samples from 86 patients, taken at different time intervals (0, 15, 30 and 60 minutes) [Montero-Salinas, 2021]. In the intra-group analysis, differences in PCO2, HCO3, hematocrit, Hb, K+ and and lactic acid were observed between the initial time of the test and the 15, 30 and 60 min intervals. In addition, changes in pH, pO2, SO2, Na and glucose were noted 30 min after the initial sample had been taken. The variation in the values, despite being statistically significant we deemed by the authors to have no clinical relevance.

A 2015 study compared analysis at 15 minutes post-sample with that at 60 minutes (Smajic, 2015). It concluded that analysis within 15 minutes after blood sampling is considered as appropriate. This study found a statistically significant decrease of pO2 and sO2 in arterial blood samples analysed after 60 minutes at room temperature indicating that metabolic consumption of oxygen exceeds its diffusion through the wall of plastic syringes.

A 2011 study compared analysis at 0, 15, 30, 45 and 60 minutes post-sample and concluded that analysis should take place within 15 minutes (Srisan, 2011). This study found that there were significant decreases in the pH, PaO2, Na, Cl and significant increases in PaCO2 and K over time. The significant decrease in pH over time was not found until 30 minutes at room temperature and 45 minutes on ice. There were significant decreases in PaO2, concurrent with significant increases in PaCO2 from 15 minutes onwards regardless of whether stored at room temperature or on ice. Both Na and K exhibited a significant change at 60 minutes in the room temperature group. Significant decreases of Cl over time were not found until 15 minutes at room temperature, and 30 minutes on ice.

Montero-Salinas A, Pérez-Ramos M, Toba-Alonso F et al. Analysis of Arterial Blood Gas Values Based on Storage Time Since Sampling: An Observational Study. Nurs Rep. 2021;11:517-21
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8608106/

Smajić J, Kadić D, Hasić S et al. Effects of post-sampling analysis time, type of blood samples and collection tubes on values of blood gas testing. Med Glas (Zenica). 2015;12:108-12
http://ljkzedo.ba/sites/default/files/unovombroju/13%20Smajic%20823%20A.pdf

Srisan P, Udomsri T, Jetanachai P et al. Effects of temperature and time delay on arterial blood gas and electrolyte measurements. J Med Assoc Thai. 2011 Aug;94 Suppl 3:S9-14

Evidence level III

Last amended April 2023
Last reviewed October 2023