

“Arterial cannulation is associated with complications including bacterial contamination, accidental intra-arterial injection and blood spillage. We performed a series of audits and experiments to gauge the potential for these, as well as assess the possible contribution of a new device, the Needle-Free Arterial Non-Injectable Connector (NIC), in reducing these risks.” Mariyaselvam et al (2014).

Reference:

Mariyaselvam, M.Z., Heij, R.E., Laba, D., Richardson, J.A., Hodges, E.J., Maduakor, C.A., Carter, J.J. and Young, P.J. (2014) Description of a new non-injectable connector to reduce the complications of arterial blood sampling. *Anaesthesia*. October 11th. .

Arterial blood sampling and the prevention of bacterial contamination <http://ctt.ec/T2o7H+@ivteam> #ivteam

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Summary:

Arterial cannulation is associated with complications including bacterial contamination, accidental intra-arterial injection and blood spillage. We performed a series of audits and experiments to gauge the potential for these, as well as assess the possible contribution of a new device, the Needle-Free Arterial Non-Injectable Connector (NIC), in reducing these risks. The NIC comprises a needle-free connector that prevents blood spillage and a one-way valve allowing aspiration only; once screwed onto the side port of a three-way tap, the device can only be removed with difficulty. We performed a clinical audit of arterial monitoring systems in our intensive care unit, which showed an incidence of bacterial colonisation of five in 86 (6%) three-way tap ports. We constructed a manikin simulation experiment of the management of acute bradycardia, in which trainee doctors were required to inject atropine intravenously. Ten of 15 (66%) doctors injected the drug into the three-way tap of the arterial monitoring system rather than into the intravenous cannula or the central venous catheter. In a laboratory study, we replicated the arterial blood sampling and flushing sequence from a three-way tap, with the syringes attached either directly to the three-way tap port or to a NIC attached to the port. The first (discard) syringe attached to the three-way tap was contaminated with bacteria. Bacterial growth was found in 17 of 20 (85%) downstream flushed samples (corresponding to the patient’s circulation) when the three-way tap was accessed directly, compared to none of 20 accessed via the NIC ($p < 0.0001$). Growth was found on all of 20 (100%) ports accessed directly compared to none of

20 accessed via the NIC ($p < 0.0001$). The NIC effectively prevents bacteria from contaminating sampling lines. As its design also prevents accidental intra-arterial injection, we suggest that it can reduce complications of arterial monitoring.

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