

Letter to the editor

An advanced puncture technique decreases the incidence of coring during the use of 50-ml propofol vials

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To the editor: The incidence of coring associated with the use of 50-ml propofol vials has been reported in a small number of studies [1,2] and coring is thought to be rare. However, we [3] reported that the incidence of coring, which may occur when medical fluids are withdrawn into a syringe from a vial, was unexpectedly high at our institute. It was suspected that coring occurred at this comparatively high rate because the operating room nurses had insufficient information about coring and had not been trained adequately in puncturing. Therefore, we examined whether the training of operating room nurses in an advanced puncture technique could decrease the incidence of coring.

One hundred and fifty propofol vials were examined to determine the incidence of coring. One examiner (K.S.) carefully observed each syringe at the time that propofol was withdrawn from a vial; the piston face of the syringe was examined after the administration of propofol in order to determine whether any fragments of rubber from the vial cap adhered to the internal wall of the syringe and/or its piston. We believe that all the macroscopic rubber fragments could be detected through this careful observation, because the specific gravity of the rubber is greater than that of the propofol solution (data not shown), and this makes the rubber fragments sink in the propofol solution if the fragments do not adhere to the syringe.

The nurses withdrew propofol into syringes from 50-ml vials, using 18G injection needles (Nipro, Osaka, Japan). Fifteen nurses were examined to determine their vial puncture technique; that is, (1) their puncture frequency, (2) angle, (3) speed, and (4) location. The nurses were then trained in an advanced puncture technique; that is, (1) single puncture, (2)

puncture at a 90° angle, (3) slow puncture, and (4) puncture at a thin site in the vial cap. The incidence of coring was then examined in a further 150 propofol vials in which the advanced puncture technique was used.

The incidence of coring before the training in the advanced puncture technique was 8.7% (13 of 150 vials). The results of the examination of the nurses' puncture technique before the training were as follows. (1) All 15 fifteen nurses punctured the rubber vial cap using a 21G or 22G injection needle as an air needle for taking air into the vial. Ten nurses punctured the rubber cap with an air needle to make it easier to insert the 18G injection needle for withdrawing propofol; that is, they punctured the same site on the vial cap twice. (2) Five nurses punctured the rubber cap aslant with the 18G injection needle with its bevel facing away from the surface of the rubber cap. (3) Seven nurses punctured the rubber cap rapidly. (4) One nurse punctured the rubber cap at a thick site rather than at a thin site. The incidence of coring after the training was 2.7% (4 of 150 vials), which was significantly lower than that found before training ($P = 0.021$ by Fisher's exact probability test).

The incidence of coring potentially increases as the number of punctures in the rubber cap increases. This potential for coring is caused by the creation of channels at the same site during repeat puncturing of the rubber cap [4,5]. The high incidence of repeat puncturing at the same site among the nurses examined here before their training may have contributed to the high incidence of coring. In addition, one-third to one-half of the nurses punctured the rubber cap aslant or rapidly, which may also have contributed to the high incidence of coring.

Coring will remain a hazard wherever vials are punctured more than once. It is important for medical and nursing staff to have sufficient knowledge of coring and an adequate puncture technique.

References

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