

Malfunction of Infusion Pump due to Electrosurgical Unit Interference

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(Key words: infusion pump, electrosurgical unit, malfunction)

Recently, we experienced the accidental malfunction of an infusion pump during an operation. A subsequent examination revealed that interference from an electrosurgical unit may cause malfunction of an infusion pump.

Case Report

A 72-year-old female with left breast cancer underwent a mastectomy. Anesthesia was induced with thiopental and maintained with nitrous oxide and enflurane in oxygen. Hypotensive anesthesia induced with prostaglandin E₁(PGE₁) was planned. Shortly after the start of the operation, we began the intravenous infusion of PGE₁ solution with the use of infusion pump (Terumo STC-521, Terumo Co., Tokyo). As a hypotensive state was not obtained, the speed of the infusion pump was increased. At this time, it was noticed that the operation panel of the pump indicated 'STOP' status and that the pump had ceased functioning. We resumed the pump to 'START' status. Since we doubted the reliability of the pump, we continued to carefully observe the pump. After a while, we found the pump stopped when the electrosurgical unit (Bovie 400-SR, Clinical Technology, Rochester, NY, USA) was employed in the coagulating mode. We presumed the abrupt stopping of the pump

was caused by electrosurgical unit interference. After that, we kept the pump away from the electrosurgical unit and attached cable through the active electrode. This displacement prevented the sequential troubles with the pump.

Discussion

Additional examination showed that the following situations could easily lead the pump to stop: 1) The placement of the pump close to the electrosurgical unit, especially to active electrode cable (within approximately 10 cm). 2) The use of the unit in higher power. 3) The use of the unit in coagulating mode, especially intermittent use within a few seconds. 4) The use of the pump when it is driven by line-power as opposed to battery power. (The pump contained a rechargeable battery in itself. Therefore the device was capable of being driven by both line-power and charged battery.) Fortunately, we did not experience that the pump altered the infusion speed itself.

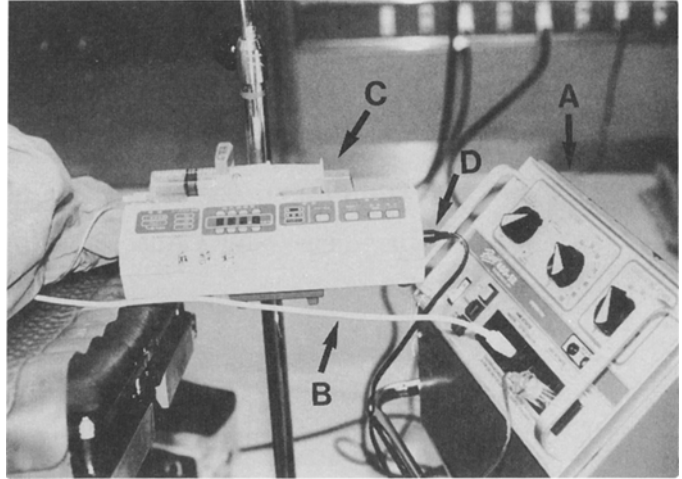
The high frequency electrical current may interfere with electrical equipment which contain microprocessors¹. In fact, we employed a pump using a microprocessor, and the electrosurgical unit might have had leakage current. The above situation 4) indicates that the leakage current also might flow through AC-line into the pump. Therefore, when we use rechargeable equipment like the pump that we used, the attached cable to the AC-line source has to be removed, if possible. This care would decrease the chance of meeting with the interference from an electrosurgical unit.

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Fig. 1. The placement of an infusion pump close to the electro-surgical unit may cause the malfunction of the infusion pump. (A: electro-surgical unit B: active electrode cable C: infusion pump D: cable attached to AC-line)



Although we did not have a chance to examine the pumps and/or electro-surgical units from other manufacturers, we supposed that similar electric interference may occur, as well as the well-known interference of the electro-surgical unit with the cardiac pacemaker^{1,2}.

The Present experience shows that the anesthesiologist should take care with the arrangement of various electrical equipment considering the possible interference in the operating room, and keep the proper functioning of the equipment in mind.

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