Unexpected technical error of patient-controlled analgesia pump despite passcode lock: A case study

Dear Editor,

Patient-controlled analgesia (PCA) after major surgery is a well-established analgesic method for postoperative pain treatment.[1]

A 71-year-old man underwent a video-assisted thoracoscopic right upper lobectomy under general anaesthesia with epidural analgesia. Patient-controlled epidural analgesia provided adequate pain control the day after the surgery. In the early hours of the second postoperative day, an alarm indicating low battery prompted the ward nurse to inspect the PCA pump (CADD-Solis PIB, Smiths Medical Japan Ltd., Tokyo). She discovered that the pump flow rate and configuration had been altered from epidural to intravenous. The patient informed her that he had touched the pump to stop the alarm. An anaesthesiologist readjusted the PCA pump settings to administer epidural analgesia for pain management. The patient was discharged on the fifth postoperative day without incident.

An examination of the PCA pump log indicated that the lock had been disengaged following three occasions of erroneous input of an invalid security code. The mode of administration had been altered from epidural to intravenous, and a priming bolus of 8.1 ml was administered [Figure 1]. The default passcode for the PCA pump was 997, unlocked after the third trial in descending order from 999. The PCA pump setting was changed early in the morning, between 2:44 and 2:53 a.m. on the second

Days	Time	
Day of surgery	13:04:56	Therapy set to PCEA
2days after surgery	2:44:39	Run mode exited -delivery stopped
	2:46:24	Invalid security code entered
	2:47:11	Invalid security code entered
	2:48:14	Invalid security code entered
	2:48:59	Keypad unlocked
	2:49:10	Given Amount counter cleared from 165.85mL
	2:49:10	PCA Dose attempted counter cleared from 14 PCA dose given counter cleared from 0
	2:49:10	New protocol settings- data start New patient started: True
	2:49:10	Library Protocol Selected
	2:49:10	Therapy set to PCIA
	2:49:10	Qualifier set to 301.5mL
	2:49:10	Drug line 1 set to 40kg
	2:49:10	Reservoir Reset Volume set to 301mL
	2:49:10	Reservoir Volume set to 301mL
	2:49:10	Reservoir Low Trip set to 5mL
	2:53:28	PCA Dose changed from 1.5ml to 1.45mL, a value below the Soft Min of 1.5mL
	2:53:41	Delivery parameters accepted
	2:56:12	Standard battery state changed to Low
	2:56:12	Low Alarm Displayed: Battery Low
	2:56:17	Low Alarm Acknowledged: Battery Low
	2:56:47	priming started
	2:58:44	priming ended, 8.1mL primed
	2:59:20	Keypad locked
	3:01:12	Run mode entered-delivery started

Figure 1: Upon scrutinising the analysis log of the PCA pump employed on this patient, it is evident that following the cessation of the pump's operation the passcode was unlocked on the fourth try after three futile attempts to enter the passcode

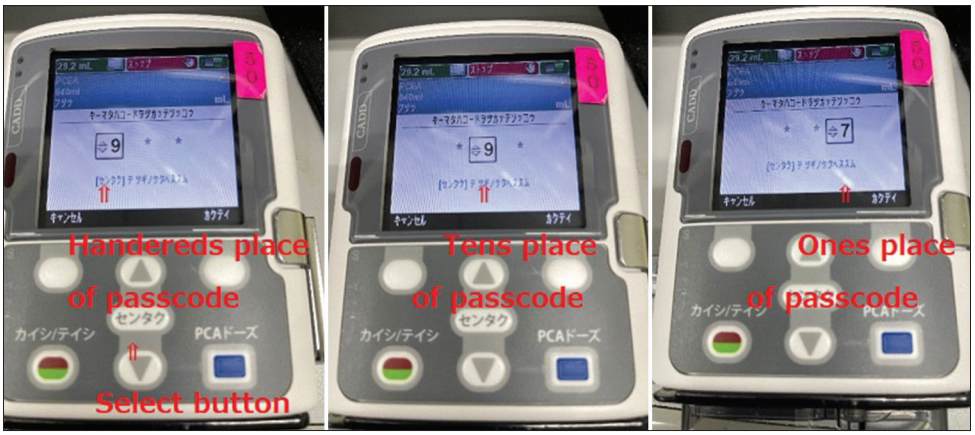

Figure 2: To unlock the PCA pump and change its setting, healthcare providers must ensure that the three-digit passcode with the up-and-down buttons is from hundreds to one place

postoperative day. The pump did not sound an alarm during that time. Its first alarm sounded at 2:56 a.m.

The most common error of PCA is dosage miscalculation, primarily attributed to errors made by medical personnel.[2] However, the intent behind unlocking and changing the settings in this instance remains to be determined. It is well-documented that individuals during postoperative period may exhibit delirium.[3] An individual in such an aberrant mental state could attempt to bypass the passcode without conscious intent. When reducing the pump's flow rate after time has elapsed from surgery and analgesia is excellent, we attempt to modify the setting of the PCA pump. We must ensure that the three-digit passcode with the up-and-down buttons is from hundreds of place to one place [Figure 2]. After inputting the applicable code, the selection button must be pressed to unlock the system and authorise the desired modifications. Our PCA pumps are also equipped with the Protocol Library Safety System, which follows standardised drug administration protocols to reduce programming errors. If the PCA pump setting has not been entered (cleared), we follow the guide displayed on the screen of the PCA pump to select the mode. The passcode lock and selection of predetermined drug dosage from a protocol library make the PCA pump more secure than basic syringe infusion pumps. Despite this, we must implement more stringent passcode management protocols and utilise complex numerical codes that are difficult to decipher rather than numerical code that can be easily unlocked in descending order to prevent potential incidents.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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