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Substance abuse

Drug diversion in the OR: How can you keep it from happening?

It's every OR manager's nightmare—a drug diversion that hits the local news. That nightmare came true for 2 Colorado facilities—Rose Medical Center in Denver and Audubon Surgery Center in Colorado Springs—this year when scrub tech Kristen Diane Parker was accused of not only stealing fentanyl, but also of transmitting her hepatitis C to as many as 27 patients in the process, according to reports from denverpost.com and the Colorado Department of Public Health and Environment (www.cdphe.state.co.us/dc/Hepatitis/hepc/InvestigationCaseTable.html).

Parker pleaded guilty September 25, 2009, and is scheduled to be sentenced in December. The recommended sentence is 20 years in prison. Rose Medical Center had terminated Parker for a failed urine test 2 months before the full scope of the problem was detected in June 2009 by the department of health, according to the hospital's website. Audubon Surgery Center fired Parker on July 1, 2009.

How can drug diversion by staff, anesthesiologists, and certified registered nurse anesthetists (CRNAs) in the OR be prevented? The American Society of Health-System Pharmacists' Guidelines on Surgery and Anesthesiology Pharmaceutical Services say that a controlled-substance system's goal is to "prevent diversion yet be practical enough that patient care is not adversely affected."

To achieve this balance, experts point to several prevention strategies—using satellite pharmacies and automated dispensing cabinets (ADCs), checking for patterns of drug use, verifying unused narcotics and other controlled substances in the pharmacy instead of "wasting" them on the units, conducting urine screens, and providing education.

The best deterrent

"The biggest deterrent to drug diversion is to have a satellite pharmacy in the OR," says Brian O'Neal, MS, PharmD, assistant director of pharmacy at the University of Kansas Hospital (UKH) in Kansas City, Kansas. "You can dispense limited quantities of controlled substances on a case-by-case basis instead of using unmanned carts." In an informal survey of directors of pharmacy, O'Neal found about half had a satellite pharmacy.

Ena Williams, RN, MBA, MSM, nursing director of perioperative services at Yale-New Haven Hospital in New Haven, Connecticut, gives an example of the value of a satellite pharmacy: "The anesthesiologists get what they need to start the day. They have to return what they don't use along with their documentation of how much was used on each of their patients, which is then reconciled by pharmacy with the amount that was obtained at the beginning of the day."

At UKH, anesthesia staff members sign out numbered packs of con-

trolled substances on a case-by-case basis. Both the pharmacist and the anesthesia staff member sign the controlled substance form. After the pack is used, the anesthesia staff member returns it and the completed form, which details usage. The pharmacist checks for any discrepancies, and then both parties sign the form to close the transaction. Several controlled substance packs are in the ADC in the OR for after-hours needs.

"You still have 2 main risk points with a satellite pharmacy," says O'Neal. "Did the person give what they said they gave, and are they returning what they were given from the pharmacy?"

Closing a loophole

To help close the first loophole, he recommends periodic audits to compare the dispensing record with the case record.

"It's work to do audits, especially if you have a busy OR," O'Neal says. "But it's important to have a system so you touch every person during a specific time frame, such as once a month." He suggests having a pharmacy technician complete the audit, with a pharmacist checking the results.

Although normally the pharmacy compares a provider's profile of controlled substance use with peers, O'Neal says that's not done in the OR "because we don't have the data to know who is involved in every case. Instead, we reconcile the practitioner against the case record: 'Tony' signed out 2 amps of fentanyl and 4 vials of Versed but did bring them back."

To close the second loophole, O'Neal recommends testing solutions when they are returned to the pharmacy to verify the substance is the unadulterated drug.

Benefits of automation

What can OR managers do if their case volume is too low to support a satellite pharmacy? O'Neal says, "The next best thing is an automated dispensing machine." ADCs such as the Pyxis MedStation (CareFusion) and AcuDose-Rx (McKesson) are suited for regulating controlled substances. These systems require a password, and staff document drug usage and waste, making it easy to check for patterns of drug usage.

ADCs also help hospitals meet Joint Commission standards related to medication management. Add-on software such as Pandora (Pandora Data Systems), Pyxis Reporter and Pyxis Consultant (CareFusion), and Rx Auditor (Medacist) can be purchased to refine reports from the ADC system.

The Institute for Safe Medication Practice has a self-assessment tool to help hospitals ensure proper use of ADCs (www.ismp. org/selfassessments/ADC/Survey.pdf).

"If you don't have either a satellite pharmacy or an automated dispensing machine, you are likely to be at high risk for drug diversion," says O'Neal.

What has been 'wasted'?

According to Parker's plea agreement, she would inject herself with a syringe with fentanyl, then refill it with saline and replace the same syringe on the tray. It's a problem similar to what happens when controlled substances not used are simply discarded or "wasted."

Many hospitals simply require nurses and physicians to have a witness when they waste a controlled substance. A major gap in this system is that

a person may substitute saline or even tap water for the drug before wasting it in front of the witness.

At UKH, nurses must return any unused narcotic to the ADC. In the OR at Yale-New Haven, nurses use the same system as the anesthesiologists—waste, such as cocaine topical solution, is returned to the satellite pharmacy. Williams says narcotic wastes are randomly tested to ensure "that the drug turned back in is really the drug and concentration that was signed out."

Outside of the OR, including in the postanesthesia care unit, the disposal of unused controlled substances by a nurse is witnessed by another nurse and documented in the ADC. "Our pharmacy can track actual removal and match that with the order and waste documentation," says Williams.

Back to the pharmacy

In O'Neal's survey, fewer than half of hospital perioperative areas sent unused controlled substances back to the pharmacy for testing.

"You lose control if you don't have the drugs going back to the pharmacy," says O'Neal. "You lose the opportunity to test it, and that's a huge risk. ORs need to put a process to that."

Testing in the pharmacy includes using a refractometer or UV spectrometry (sidebar, p 10). About one-third of hospitals use a refractometer according to the survey by O'Neal, and only 1% use UV spectrometry because of its expense.

An ADC coupled with refractometer testing and an agreement with the anesthesia staff about testing for cause is an ideal combination for smaller hospitals, says O'Neal.

Some methods of drug diversion are more difficult to detect than others. One example is "splitting," where the person injects part of the dose into the patient but injects the rest into his or her own body. Unfortunately, in this case the "drug count" will be correct, which makes it essential to check for patterns of drug usage on a regular basis.

Finding patterns

Williams says the pharmacy generates monthly reports from the Pyxis system. "The pharmacy checks to see if a person's patterns fall outside criteria for normal usage," says Williams. If that occurs, the pharmacy investigates. The investigation includes comparing the data in the hospital's clinical documentation system against the Pyxis data. Sometimes patterns can be explained such as a new nurse in PACU who is not familiar with the patient population.

Mining data for clues

Richard H. Epstein, MD, professor of anesthesiology at Jefferson Medical College in Philadelphia, says each month the pharmacy provides an extract of all transactions executed from its ADCs. Using custom software developed in-house, this data is merged with data from the hospital's anesthesia information management system (AIMS) to identify anesthesia providers with a very high incidence of atypical transactions.

"This was originally a data-mining exercise," says Dr Epstein, who developed specific formulas for querying the dataset (sidebar, p 11). The system, used with anesthesiologists and CRNAs, started in 2006 in response to 2 individuals who were caught diverting drugs; the system would have

correctly flagged them had it been in place and has since identified 2 others who where diverting drugs.

Once an alert has been raised about a specific person, Dr Epstein investigates further, examining every transaction and comparing it to the corresponding AIMS record.

"If someone is diverting, it's generally obvious once you start looking at the transactions," he says. "The times are off, there is too much wasting, or it's not their patient. If someone visits the cookie jar too often, we can find it."

If the findings strongly confirm suspicions, members of the department's impaired physicians committee arrange a confrontation with the person. The person can either admit the diversion or deny it, which then requires an immediate urine test. If the person refuses to be tested, he or she is immediately terminated. If the person denies diversion, he or she is placed on paid administrative leave while awaiting the urine test results.

"When presented with the evidence, most people will admit it at once," Dr Epstein says.

Random urine testing

One technique that may see wider use in the future is random drug testing. Massachusetts General Hospital (MGH), Boston, started mandatory random urine testing of anesthesiology residents in 2003, according to a report by Michael Fitzsimons, MD, and his colleagues in the August 2008 *Anesthesia & Analgesia.* The authors noted that anesthesiology residents seem to have one of the highest incidences of pharmaceutical addiction of all health care providers, although the estimate is 1.6%.

Random drug urine testing for anesthesia personnel is contentious. For example, some feel it violates a person's civil rights, is demeaning, and unfairly targets one group of residents. Dr Epstein notes that unwitnessed urine collection is subject to risk of fraud such as substitution and adulteration of the specimen.

In an email, Dr Fitzsimons wrote that bathrooms have been modified to help prevent fraud and added, "Courts have ruled that the protection of the public trumps personal rights when an individual has the safety of the public in their hands—pilots, drivers, and Department of Transportation employees."

Providing education

Staff education should include recognizing early signs and symptoms of addiction. "You may not notice an abnormal behavior in isolation," says Williams, "but when you start putting the incidents together, they mean something."

O'Neal recommends letting staff know you have a diversion detection program. "You don't want to say too much so they know what you do, but make it clear you have a program in place."

Epstein agrees and adds nurses should note any behavior involving controlled substances that seems out of the ordinary. "If something seems odd, don't confront the person, but raise your concerns with the chair of anesthesiology or your supervisor, depending on the situation. You're not making an accusation; you're just reporting."

"People need to feel comfortable speaking up, so we can identify those who need help," says Williams. "They are not only protecting patients but

also helping their colleagues." She adds that staff need to be aware of the hospital's employee assistance program. "It is a confidential process; not even the manager is privy to it," she says. "It can support employees in all crisis situations."

Appropriate followup

Hospitals need to have policies and procedures related to prevention of substance abuse and follow up if abuse is suspected, including treatment and reentry into the workforce.

"The hospital is very strict when it comes to reentry," say Williams.

Employees may need to change to a work location where they have less access to controlled substances and will need to check in on a regular basis.

Keeping perspective

O'Neal, Epstein, and Williams agree early detection of substance abuse is important not only to protect patients but also so the person gets help.

"They have a disease," Epstein says. "If we can catch them really early, they can go through rehabilitation and hopefully return to the practice of medicine." ❖

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Types of drug diversion in OR

- Substitution of controlled substance with noncontrolled substance.
- "Splitting": Injecting part of the medication in the patient but injecting the rest into the health care worker's own body.
- Tampering (use tamper-resistant locks to avoid this problem).
- Removing large volumes of medication over short periods of time. An example is frequently depleting the supply of morphine over a single shift. Experts recommend tracking early depletion of stock.
- Theft (for example, taking propofol from an open bin without signing it out).

Drug detection methods

Two methods to check for drug substitution are refractometry and ultraviolet (UV) spectrophotometry.

Refractometry

Pharmacists often use a refractometer to check the purity of controlled substances returned to the pharmacy. This device measures the refractive index of a substance to compare against the refractive index of a reference standard.

Refractometers are easy to use, relatively inexpensive, and provide immediate results. At Ohio State University Medical Center, Columbus, a tester and a witness are used: a pharmacist and a trained technician. If a positive test occurs, the roles can be reversed to double-check the results.

Unfortunately, the refractive indices for fentanyl and sufentanil are the same as the index for distilled water, making refractometry an unreliable screening tool for these drugs.

UV spectrophotometry

The tester shines the system's UV light source through a drug sample to produce a pattern of fluorescent energy. The pattern is compared with the control in the system's library to validate the identity and concentration of medication. This technique is much more expensive than refractometry.

Source: O'Neal B, Bass, K, Siegel J. Hospital Pharmacy. *2008;42: 359-363.*

Structured query language

These are examples of formulas used to create structured query language (SQL) to analyze controlled substance use over a given data range.

- **Opioid usage:** Compute average daily amount of fentanyl equivalents dispensed by provider.
- **Controlled substance wastage:** Compute average daily total wastage of fentanyl equivalents and of midazolam by provider.
- **Transactions on cancelled cases:** Compute average daily number of individual ADC [automated dispensing cabinet] transactions executed on cancelled cases.
- **Late ADC transactions:** Compute average daily number of individual transactions executed after the end of the case.
- **Mismatched location transactions, mismatched location quantities:** Compute average daily number of individual vials removed from workstations in an OR location different from where the case was actually performed (applies if an ADC is located in each OR location).

Adapted from Epstein R H, Gratch D M, Grunwald Z. Anesth Analg. *2007;105:1053-1067.*