Quarterly Update on Wrong-Site Surgery: Marking for Regional Anesthetic Blocks

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As of July 23, 2014, there were 14 reports of wrong-site surgery in Pennsylvania operating rooms (ORs) during the second quarter of 2014 and 1 belated report from a prior quarter (see the Figure). Despite the increase in reports of wrong-site surgery this quarter over the previous three quarters, the total for the academic year 2013-2014 is the lowest to date: 45.

Of the 14 reports, 3 involved hand procedures, 2 were wrong-level spine operations, 2 involved ovarian surgery, and 1 of the other 7 was a wrong-side anesthesia block, which remains the most common wrong-site event for the academic year (n = 7 of 45) and the decade (n = 122 of 586). Two of the three incorrect-hand procedures involved starting a carpal tunnel procedure instead of the intended trigger finger release. This one type of error now represents 28% of all wrong-site hand surgery events (n = 11 of 39) and 2% of all wrong-site surgery events reported from July 1, 2004, through June 30, 2014.

Near-miss reports continue to demonstrate both areas of continued weakness and the effectiveness of the evidence-based best practices to prevent wrong-site surgery.[1,2]

Operations continue to be scheduled incorrectly, introducing errors into the verification process:

> *Procedure was booked as I&D [incision and drainage] of bilateral groin abscesses. Correct procedure was completed, which was I&D of bilateral axillary abscesses.*

> *Patient was scheduled for shoulder arthroscopy. Office schedule listed "left." OR schedule said "left." Patient to preoperative holding [area]; consent, H&P [history and physical], and patient stated "right," which is the correct side. The right side was confirmed and prepped.*

Fortunately, those receiving patient information have been checking for discrepancies and identifying them as soon as discovered for reconciliation by the surgeon based on primary sources of information:

> *Patient consented for a left craniotomy. Anesthesia noted that patient was scheduled for a right craniotomy. Neurosurgeon notified.*

> *OR schedule indicates left parietal craniotomy. Consent indicates right craniotomy. While patient was in the preoperative holding area, the surgeon was notified of the discrepancy. MRI [magnetic resonance imaging scan] was reviewed (verified right side as correct side). Surgeon, patient, and nurse verified right side as correct.*

Surgeons marking the site are not always confirming the site prior to marking with all the relevant information and with the patient, as is obvious from the following:

> *Presented for hysterectomy. Eye surgeon initialed above right eye, but this is not an eye patient. Eye surgeon was made aware and initials removed. This patient had the correct procedure completed.*

> *During preoperative assessment, the patient confirmed right-sided surgery. The surgeon marked the right side of patient. However, the consent read "left." The error was discovered during the time-out verification.*

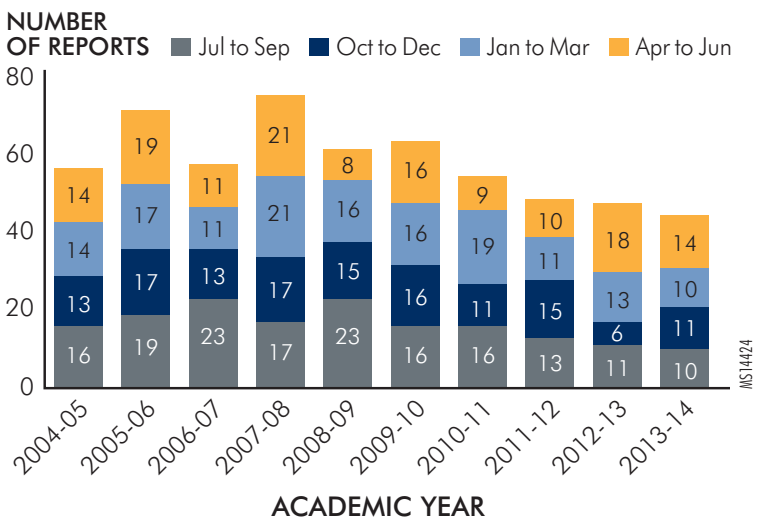
> *This patient was [scheduled] for a bilateral ophthalmic keratopathy. The procedure was confirmed as bilateral and the surgeon marked the patient bilaterally. It was noted during the time-out that laterality was not designated on the consent. The procedure was completed bilaterally.*

The value of the mark is evident from this report:

> *Left leg was initially prepped and then staff realized that the patient was marked on the right and that the consent was also for the right side. Right leg prepped and procedure started without issue.*

Scan this code with your mobile device's QR reader to access the Authority's toolkit on this topic.

Figure. Pennsylvania Patient Safety Authority Wrong-Site Surgery Reports by Academic Year



Switching ORs and running two rooms caused confusion resulting in the wrong patients being brought to these ORs:

> *A CRNA brought a patient into the OR suite not realizing that the surgeon/patient's room [had been] swapped with that of another. The outcome was that once the patient entered the room and was identified as the wrong patient, the patient had to be wheeled out. Both patients were [scheduled for] laparoscopic cholecystectomies by two different surgeons. Despite what the monitor said, the rooms were swapped and the CRNA was not aware of the circumstance.*

> *Surgeon began swinging between two operating rooms, and patients were being moved to different rooms. There was confusion on which patient was going to which room, and the patient was sent to the surgeon's other operating room. The planned procedure remained the same (right knee arthroscopy) and no equipment needed [to be] changed. However, the patient was greeted by the circulating nurse and asked his/her name, and it was discovered that they were expecting a different patient.*

IMPROVEMENT BY AREA

Analysts compared reports of wrong-site surgery for the first three years of facility reporting through the Pennsylvania Patient Safety Reporting System, before intense scrutiny with the onset of the wrong-site surgery project in July 2007, with reports for the most recent three years. Overall, there were 24% fewer reports in the most recent three years compared with the initial three-year baseline (see the Table). Comparing specific procedures to the overall experience, a statistically significant improvement was observed for thoracic procedures (5 to 0) and orthopedic procedures on the knee (11 to 2), with reductions of reports of wrong-site events for all surgical procedures on the leg.

In contrast, there was minimal reduction of reports of wrong-site events for procedures on the hand, none for procedures on the elbow, and an increase in the number of reports for procedures on the shoulder.

Another contrast was an increase in anesthetic blocks on the legs by anesthesiologists, despite a decrease in the number of wrong-site anesthetic blocks overall.

A statistically significant improvement was observed for eye blocks by ophthalmologists, although that might have been due to the shift to topical anesthetics. However, other eye procedures were also trending toward improvement.

Other commonly reported wrong-site procedures were, if anything, more common: wrong-level spinal surgery, procedures for pain management, and ureteral stenting.

The results by area indicate that focus should continue on wrong-side leg blocks by anesthesiologists, wrong-site hand surgery (especially absentmindedly starting a carpal tunnel release instead of a trigger finger release), wrong-level spine procedures, wrong-side pain management procedures, and wrong-side ureteral stenting.

MARKING THE SITE OF THE ANESTHETIC REGIONAL BLOCK MAY PREVENT WRONG-SITE REGIONAL BLOCKS

Marking the site of the surgical incision has proven to be a useful reference to the correct surgical site during the time-out before surgery.[3] The act of marking the surgical site after verification of the correct site with the documents and the patient in the preoperative holding area may refresh the surgeon's short-term memory prior to the final time-out. Pointing to the mark on the surgical site in the prepped and draped surgical field is a valuable surrogate for verbal confirmation by the patient, who is usually anesthetized and unable to otherwise participate in the final time-out process.[3]

Using the three steps of the Universal Protocol[4] when doing a regional

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Table. Reductions in Wrong-Site Operating Room Procedures by Type

PROCEDURE TYPE	2004 TO 2007 (BASELINE)	2011 TO 2014 (MOST RECENT PERIOD)	% DECREASE
All	**187**	**142**	**24.1**
Eye blocks by surgeons	8	0	100.0*
Thoracic	5	0	100.0*
Colon	4	0	100.0
Orthopedic ankle	2	0	100.0
Orthopedic knee	11	2	81.8*
Wrong device inserted	7	2	71.4
Ear, nose, and throat	6	2	66.7
Eye surgery	13	5	61.5
Knee blocks by surgeons	6	3	50.0
Graft harvest	4	2	50.0
Craniotomy	2	1	50.0
Orthopedic femur and hip	2	1	50.0
Urological procedures except ureteral	2	1	50.0
Endocrine	2	1	50.0
Wrong-side spinal surgery	5	3	40.0
Foot	9	6	33.3
Eye blocks by anesthesiologists	3	2	33.3
All pre-op anesthesia blocks	48	34	29.2
All blocks by anesthesiologists	32	26	18.8
Hand	13	12	7.7
Vascular and dialysis	3	3	0.0
Elbow	1	1	0.0
Dental and oral surgery procedures	1	1	0.0
Wrong-level spinal surgery	19	23	Increased
Pain management	19	21	Increased
Ureter	9	10	Increased
Leg blocks by anesthesiologists	6	9	Increased
Breast	4	6	Increased
Gynecological	2	4	Increased
Wrong lesion	2	4	Increased
Hernia	1	2	Increased
Shoulder	0	2	Increased
Bariatric	0	1	Increased

Note: Events total more than all cases because some were included in more than one category.

* Statistically significant differences by chi-square test ($p < 0.05$)

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anesthetic block is recommended for this separate perioperative procedure.[1,2] The advantage or disadvantage of separately marking the site of the regional anesthetic block has been debated in theory but not tested in practice. The advantage is the value of the mark as a reference point. The disadvantage is the potential to be mistaken for the surgical mark and lead to a wrong-site operation. In the absence of evidence of the superiority of one approach over the other, the Pennsylvania Patient Safety Authority has not previously commented on whether the regional anesthetic block site should be separately marked. However, some departments of anesthesia, perhaps motivated by wrong-site blocks, have instituted policies of separately marking the site of a regional anesthetic block.

The Authority conducted a survey to determine how common the policy of separately marking the regional anesthetic block site was in Pennsylvania and if implementation of such a policy has been associated with a reduction of reports of wrong-site blocks.

At the end of the first quarter of 2014, the Authority sent a two-question survey to each acute care hospital and ambulatory surgical facility. The questions were as follows:

1. Does your medical facility have a policy or procedure that requires the anesthesia provider to mark the anesthesia site where a regional or local anesthetic block will be administered?
2. If yes, when was this policy or procedure implemented?

At the time of the survey, wrong-site anesthetic blocks were the most common wrong-site procedures in operating suites, accounting for 121 (21%) of the 571 wrong-site procedures in operating suites since the onset of reporting in July 2004. Survey responses were received from 69 facilities, of which 29 indicated that they had implemented such a policy since reporting began and 2 indicated that they had implemented such a policy prior to the onset of reporting. Among the 29 facilities that had made a change, the time of the change ranged from the first quarter of 2006 to the first quarter of 2014, with the median being the first quarter of 2012. These 29 facilities reported 25 wrong-site anesthetic blocks before implementing their policies and 5 after implementing their policies.

To balance the before and after times, only a subset of reports submitted from each facility for equal months before and after it implemented the change was considered for comparative analysis. If a facility implemented the change during the first quarter of 2012, then the nine quarters under the new policy were compared with the last nine quarters under the old policy. During these balanced periods before and after the implementation of the change, the facilities reported 12 wrong-site anesthetic blocks before the change and 3 after. Aside from 18 facilities that had no wrong-site procedures in either period and 1 that reported 1 wrong-site procedure in each period, 9 had fewer wrong-site blocks after initiating the change and 1 had more wrong-site blocks after initiating the change. This improvement after implementation of the change in policy was statistically significant by the sign test ($9/10$, $p < 0.05$). No facility reported wrong-site surgery as a result of erroneously referencing the site mark for the anesthetic block during the final time-out for the surgical procedure.

It is possible that the results are biased as a result of an event precipitating an immediate change in policy and increasing vigilance in the period following this change. However, several changes were implemented at system levels, meaning that multiple facilities, such as a hospital and an ambulatory surgical facility, experienced a change in policies without necessarily having an institutional experience with a wrong-site block. One of the wrong-site blocks following the implementation of the change in policy was in such a facility. However, this facility had experienced three wrong-site blocks prior to the balanced preimplementation period, so it actually experienced fewer blocks after implementation of the change in policy, albeit over a shorter total time.

As a result of the analysis based on these survey results, the Authority encourages facilities to consider developing polices within their anesthetic department to independently mark the regional block sites. Considerations for such policies include the following:

- The mark be placed after the surgeon marks the surgical site as a reference and so as to not obscure the surgeon's mark.
- The mark be placed after verification of the appropriate site for the regional block with reconciliation of all relevant information, including the schedule, the surgical consent, the history and physician examination, the patient's understanding, the surgeon's site mark, and the anesthesia consent.
- The convention for the anesthetic block mark be identifiable as a mark for an anesthetic block and be distinct from the convention for the surgical site mark.
- The anesthetic block mark be referenced in the prepped and draped field during the time-out for the anesthetic block.
- The anesthetic block mark not be visible in the prepped and draped surgical field.

NOTES

1. Pennsylvania Patient Safety Authority. Principles for reliable performance of correct-site surgery [online]. 2012 [cited 2014 Jul 17]. http://patientsafetyauthority.org/EducationalTools/PatientSafetyTools/PWSS/Documents/principles.pdf
2. Quarterly update: the evidence base for best practices for preventing wrong-site surgery. Pa Patient Saf Advis [online] 2010 Dec [cited 2014 Jul 17]. http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2010/dec7(4)/Pages/151.aspx
3. Clarke JR. Quarterly update: what might be the impact of using evidence-based best practices for preventing wrong-site surgery? Pa Patient Saf Advis [online] 2011 Sep [cited 2014 Jul 17]. http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2011/sep8(3)/Pages/109.aspx
4. Joint Commission. The universal protocol for preventing wrong site, wrong procedure, and wrong person surgery [online]. [cited 2014 Jul 17]. http://www.jointcommission.org/assets/1/18/UP_Poster1.PDF

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