Survey of Wrong Site Regional Anaesthetics

H. Simmons¹, R. Brits¹, Department of Anaesthetics, East Lancashire Hospitals NHS Trust, Lancashire

Date: 19 May 2011
Contact: hsimmons@doctors.org.uk or rudi.brits@elht.nhs.uk

Introduction

Wrong site procedures should not happen. According to the National Patient Safety Agency (NPSA)¹ they are ‘Never Events’: serious, largely preventable patient safety incidents that should not occur if the available preventative measures have been implemented. Although we have developed many safeguards against wrong site surgical procedures, wrong site regional blockade is often overlooked, and despite the potential for serious harm to patients is specifically excluded from the ‘Never Event’ List. This is despite (in 2007-8) more wrong site blocks than surgical procedures being reported to the NPSA’s patient safety incident database (Reporting and Learning System, RLS)². There is no doubt that these events are uncommon, but only one centre has published case reports (4 cases) of wrong site regional blockade³,⁴, and despite anecdotal evidence that they have occurred at other centres⁵ there is little information specific to anaesthesia and the incidence remains unknown.

It is apparent that the consequences of wrong site surgery may be disastrous, and there has been considerable investigation into its incidence and prevention. Some studies suggest that high risk surgical specialities such as orthopaedics carry a career risk of performing a wrong site procedure of up to one in five surgeons⁶. Many risk factors have been identified⁷, but as yet there is no protocol that will eliminate the possibility of performing a wrong site procedure, which have even occurred even when all preventative processes were followed correctly⁸. Although the likely consequences of a wrong site block are less catastrophic, it is still possible to cause significant harm and inconvenience through complications or the cancellation of a procedure. The drive to eradicate wrong site blocks will require us to prioritise preventative measures and address the issue formally.

The reporting of regional anaesthetic outcomes has historically been poor, but is now improving⁹. The inception of large scale incident reporting systems in many countries may be responsible for the increase in reporting of wrong site regional blocks. The RLS received 62 reports in the UK in a year, the Australian Incident Monitoring Study¹⁰,¹¹ detected 10 cases (in published summaries of incident reports), and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) in the US found peripheral nerve blocks rose from 2% to 16% of their wrong site reports¹².

In the UK, the Safe Anaesthesia Liaison Group (SALG), comprising members from the RCoA, NPSA and AAGBI, has piloted an electronic online reporting system (Anaesthetic eForm) to help estimate the incidence of adverse events of all kinds and more effectively prevent complications. It had 280 reports of harm or near misses during the pilot stage¹³,¹⁴, and in total it identified five wrong site blocks (between May 2008 and April 2010)¹⁵.

Procedures designed to minimise patient risk are now becoming widespread internationally. In America, the Universal Protocol¹⁶ (intended to prevent wrong person, wrong site and wrong
procedure surgery) has been in use since 2004. It is based on the premise that a standardised protocol is the most effective way of achieving safety, incorporating a pre-procedure verification process, site marking and a ‘time out’ directly before the procedure.

Clinicians in the UK will recognise it as similar to the WHO Surgical Safety Checklist, which should now be completed for every patient undergoing a surgical procedure.\(^{17,18}\) Stated objectives include ‘operating on the correct patient at the correct site’ and ‘preventing harm from anaesthetic administration,’ which are certainly priorities for the anaesthetist. However, in most centres the WHO ‘time out’ is not completed until the patient is in the operating room.

We report two recent cases of wrong site regional blockade. We also surveyed anaesthetists to gain an insight into their experiences of wrong site regional blocks, local practices and their opinion of possible checking procedures.

Case reports

Case Report 1

A fit and well 52 year old male was scheduled for a distal biceps tendon repair of his right arm, which was injured in a fall. The patient was seen pre-operatively and an interscalene block was planned for post-operative analgesia.

On arrival in the anaesthetic room all routine checks were performed, including correct site checking. Two anaesthetists and two anaesthetic assistants were present. The right upper arm had been marked (with an arrow) by the surgeon prior to arrival. Its position was noted by all staff present and a cannula was inserted in the patient’s left hand. Following the induction of anaesthesia the anaesthetic trainee (directly supervised by a consultant) performed an interscalene block using ultrasound and a nerve stimulator. It was performed asleep as the patient was extremely anxious and the trainee was somewhat inexperienced. The site was cleaned and covered with a sterile drape. Good views of the brachial plexus were present and the block was performed with 20ml 0.375% bupivacaine with no technical difficulty. After the drapes were removed, to everyone’s disbelief it was realised that, despite four people being present, the block had been performed on the wrong side. It was decided to proceed with surgery and use morphine intra-operatively and a morphine PCA (Patient Controlled Analgesia) for post-operative pain relief. An interscalene block on the right side was contraindicated due to the significant risk of bilateral phrenic nerve palsy. The situation was explained to the patient once awake and he was seen by the consultant anaesthetist the following day for further explanation and apology. There were no complications from the regional block although the patient complained of pruritis from the PCA.

Case report 2

A 53 year old male was scheduled to undergo an elective left total knee replacement for severe arthritis following a road traffic accident, and had no significant co-morbidities. He spoke little English. He was seen pre-operatively and it was decided to perform surgery under spinal anaesthesia with femoral and sciatic nerve blocks for post-operative analgesia.

On arrival in the anaesthetic room all routine checks were performed, including correct site checking. The anaesthetist confirmed the site with the patient asking if it was the ‘right’ side and the patient confirmed this.
The site was cleaned and femoral and sciatic blocks were performed using a nerve stimulator, using a total of 40ml 0.375% bupivicaine. After the patient was positioned to perform the spinal anaesthetic the surgical site marking was noticed on the opposite side – i.e. the left knee. Although the patient was awake throughout, he did not inform the anaesthetist at any stage that he was performing the block on the incorrect side. It was decided after discussion with the patient to continue with the procedure. A femoral block (20ml 0.25% bupivicaine) was performed without incident on the left side followed by a spinal anaesthetic and sedation for the procedure. Surgery was uneventful and there were no complications from the regional blocks.

Why does it happen?

Both these case reports had multi-factorial causes:

- **Distractions**
  - Multiple people in the anaesthetic room
  - Teaching/Training
  - Use of unfamiliar techniques
  - Change to routine anaesthetic technique
  - Time pressures

- **Terminology**
  - Ambiguous terminology e.g. the right side instead of correct side
  - Incorrect or confusing terms

- **Language barriers**
  - Patients or clinicians may speak English poorly.
  - Misunderstanding of questions or procedure

- **Surgical site marking**
  - Surgical mark is distant from block site and not visible during procedure
  - Very few anaesthetists mark their own nerve block sites

- **Checking procedures**
  - Multiple patient and surgical site checks are performed in the operating theatre, but are often not applied to anaesthetic procedures

Survey

Aim

As a result of the two wrong site blocks performed recently at our centre, and the scarcity of case reports in the literature, we aimed to determine whether the issue of wrong site regional blocks was more widespread than may previously have been thought.

Methods

We conducted a survey of anaesthetists of any grade in our region by inviting them, via email contacts at each hospital, to complete a voluntary, anonymous, online survey (www.surveymonkey.com) of their grade, experience of performing regional blocks and regional block site checking procedures at their hospitals. Certain sections invited free text comments from respondents. No time limit was set for the reporting of incidents (i.e. incidents at any time in the past were included). Responses were analysed using Microsoft Excel and comments were analysed and categorised by hand. If comments mentioned more than one theme, each was included in the analysis.

Results
There were 153 responses, one of which was excluded as it was a duplicate entry leaving 152 responses included in the analysis. 63.8% of respondents were consultants, 23.7% were post primary trainees, with smaller numbers of staff grades and ST1-2 trainees.

**Grade of Respondent**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>63.8%</td>
<td>(97)</td>
</tr>
<tr>
<td>Associate Specialist</td>
<td>2.0%</td>
<td>(3)</td>
</tr>
<tr>
<td>Staff Grade/Clinical Fellow</td>
<td>6.6%</td>
<td>(10)</td>
</tr>
<tr>
<td>ST3-7 / Registrar</td>
<td>23.7%</td>
<td>(36)</td>
</tr>
<tr>
<td>ST1-2</td>
<td>3.9%</td>
<td>(6)</td>
</tr>
</tbody>
</table>

**Frequency of performing regional blocks**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>7.2%</td>
<td>(11)</td>
</tr>
<tr>
<td>Weekly</td>
<td>52.6%</td>
<td>(80)</td>
</tr>
<tr>
<td>Monthly</td>
<td>24.3%</td>
<td>(37)</td>
</tr>
<tr>
<td>Less Than Monthly</td>
<td>15.8%</td>
<td>(24)</td>
</tr>
</tbody>
</table>

**Have you ever performed a regional block at the wrong site?**

26.3% of respondents (40/152) had performed a regional block on the wrong site at some point in their career. The commonest reported blocks were femoral (17), ilioinguinal (9) and interscalene (5), possibly reflecting the widespread use of these blocks in clinical practice. No respondent reported more than one wrong site regional block.

<table>
<thead>
<tr>
<th>Block Type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femoral</td>
<td>14</td>
</tr>
<tr>
<td>Femoral and sciatic</td>
<td>2</td>
</tr>
<tr>
<td>Femoral and 3 in 1</td>
<td>1</td>
</tr>
<tr>
<td>Ilioinguinal</td>
<td>9</td>
</tr>
<tr>
<td>Interscalene</td>
<td>5</td>
</tr>
<tr>
<td>Lumbar plexus</td>
<td>1</td>
</tr>
<tr>
<td>Brachial</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Block Type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subtenons</td>
<td>1</td>
</tr>
<tr>
<td>Stellate Ganglion</td>
<td>1</td>
</tr>
<tr>
<td>Inguinal</td>
<td>1</td>
</tr>
<tr>
<td>Fascia Iliaca</td>
<td>1</td>
</tr>
<tr>
<td>Lat. Cutaneous nerve of thigh</td>
<td>1</td>
</tr>
<tr>
<td>Lumbar sympathectomy*</td>
<td>1</td>
</tr>
<tr>
<td>Unspecified</td>
<td>1</td>
</tr>
</tbody>
</table>

*First half of a bilateral two stage procedure

**If you have performed a block at the wrong site, was the patient awake or asleep?**

40% (16) of the 40 wrong site blocks were performed on patients who were awake.

**Have you ever been stopped by someone else from performing a regional block at the wrong site?**

17.8% (27) of our respondents had been stopped by someone else from blocking the wrong site.

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17.8%</td>
<td>(27)</td>
</tr>
<tr>
<td>No</td>
<td>80.9%</td>
<td>(123)</td>
</tr>
<tr>
<td>Skipped</td>
<td>1.3%</td>
<td>(2)</td>
</tr>
</tbody>
</table>
When performing a regional block, do you mark your site separately from the surgical mark, e.g. by surface markings, initials or arrows?

Only 9% of respondents reported marking their block site.

<table>
<thead>
<tr>
<th></th>
<th>Do you mark?</th>
<th>Checking procedure in your dept?</th>
<th>Should there be a checking procedure?</th>
<th>Should block site check be in WHO list?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9.2% (14)</td>
<td>18.4% (28)</td>
<td>70.4% (107)</td>
<td>47.3% (72)</td>
</tr>
<tr>
<td>No</td>
<td>88.1% (134)</td>
<td>80.2% (122)</td>
<td>26.3% (40)</td>
<td>51.3% (78)</td>
</tr>
<tr>
<td>Skipped</td>
<td>2.6% (4)</td>
<td>2.6% (4)</td>
<td>3.2% (5)</td>
<td>1.3% (2)</td>
</tr>
</tbody>
</table>

Is there a correct site marking procedure for regional blocks in your department?

18% (28) of respondents reported that there was a block site checking procedure in their department. They were asked to summarise that procedure. The commonest methods mentioned were the WHO checklist (10), the surgical mark (6), confirmation with the patient (6) or the theatre checklist (4) as well as the operating list, consent form, or a ‘correct site’ form. Two respondents said they had their own personal methods.

Do you think that anaesthetists should follow a specific checking procedure for regional blocks?

70% (107) of respondents believed that there should be some form of checking procedure for regional blocks. Comments were invited. Amongst those who agreed, marking the site of block or having a time out directly before inserting the needle was the most common suggestion (10), with others advocating marking the site only if distant from the surgical mark (4). Others said that confirming the site with the operating list or patient would be adequate (5). Respondents who did not see the need for a specific checking procedure also commented, stating that the current methods were adequate, i.e. the surgical mark (7), WHO checklist (3), confirming with the patient (4) or the doctors own check (1). Respondents on both sides stated that extra paperwork would be unwelcome (3).

Do you think that a regional block site check should be included in the WHO theatre checklist?

47.4% (72) of respondents believed that a specific block site check should be included in the WHO checklist. Of the comments, most were not supportive of the WHO checklist for this purpose. Amongst the objections were views that the WHO checklist was already too complicated and cumbersome (4), it is performed too late, once the block has been administered (4), or that the checklist has not been shown to improve safety (2). Some (6) stated that they believed the WHO checklist already serves this function.

Limitations

Due to the open nature of the email invitations, we are unable to calculate a response rate or incidence of wrong site regional blocks. We assume there is an element of responder bias, i.e. doctors who have experienced a wrong site block or a near miss were more likely to complete the survey, and the small number of responses from some grades (particularly non-training grades) may signify reluctance by non-consultants to report errors. Also we did not record when the incidents occurred - some were from many years ago, before checking protocols were commonplace.
Discussion

Fortunately, the incidence of wrong site events is small. However, our survey identifies 40 incidents of wrong site regional blockade, and despite its limitations may suggest that the phenomenon of wrong site procedure is more common in regional anaesthesia than the literature would lead us to believe, possibly comparable to the one in five lifetime risk reported for some surgical specialities. The low incidence leads to difficulty in predicting their occurrence and assessing preventative measures.

We question whether current methods of ensuring correct administration of blocks are adequate. Few (9.2%) of our respondents mark their own block site, most preferring to rely on other methods. The surgical site mark was cited as a commonly used confirmation of block site. However, despite the majority of procedures being marked by the surgeons, we are still performing wrong site blocks. The block site is often distant from the surgical site or covered by drapes during crucial last minute checks. Some question whether we should mark our blocks at all, as it may become confused with the surgical mark. There is no convention in the UK regarding how sites are marked, although some groups in the US advocate the ‘Sign Your Site’ method, by which the clinician’s own initials are used.

Another common method was a verbal confirmation with the patient. However, we found that 40% of the wrong site blocks in this survey were performed on awake patients, a pattern seen in other reports. Patients, even if lucid and alert, can easily be led to confirm erroneous facts due to trust in the doctor or system, psychological stress, or an incomplete understanding of the procedure to be undertaken, and other staff members can easily be ‘trapped’ into counter-checking incorrectly. Using open questions with the patient may minimise this problem but cannot remove it completely.

Only 18% of those surveyed reported that their department had a specific block site checking procedure, such as cross checking one or more of the theatre checklist, operating list, surgical mark, WHO checklist and consent forms. Some reported they had their own method e.g. “Since the wrong-side block many years ago I have my own checking protocol which has been successful for the past 10 years,” but only one mentioned a ‘correct site form,’ and there were no reports of department wide protocols specific to regional anaesthesia.

The majority of respondents (70%) felt that there should be some form of checking procedure such as marking the site or having a ‘time out’ directly before draping or inserting the block needle. However there was some vehement criticism of this suggestion, with several respondents commenting that anaesthetists should not need extra checks or that the safeguards we currently have in place are more than sufficient, even after they had reported incidents where these methods had not been effective.

“I believe that anaesthetists should confirm with the patient what operation and where the operation is to be with the patient. WE DO NOT NEED ANOTHER PIECE OF TIME WASTING BEAUCRACY. We need professional (sic) careful doctors.”

“It should be clear from the surgical marking and from the WHO checklist what side you are going to block. A verbal check with the patient (who is usually awake) should confirm this. The incident with the wrong side block above was on a confused patient unfortunately.”
We felt that some of these views disregard the existence of human error, an attitude that must be changed before we can establish systems to minimise the risks\textsuperscript{21}. Factors such as fatigue and distraction are rarely recognised as risks at the time of the procedure (although obvious in hindsight), so care must be taken to remove as much human error as possible before it affects the patient.

The WHO checklist, the use of which is now mandatory in operating theatres (as of February 2010) was suggested in the survey as a possible method of checking block sites. The response to this was equivocal with only 47.4\% of respondents stating it should be used for this purpose. There were a variety of objections, mainly concerned with the timing of the WHO checklist (in most centres it is completed in theatre, after anaesthesia but before surgery), but also a dissatisfaction with the WHO checklist due to its complexity and a perceived lack of evidence that it is effective.

“\textit{Time to do the check is when stood at patient with syringe of LA in your hand, just before you inject. NOT when doing a checklist. This would be falsely reassuring, or just lead to duplication.”}

“\textit{While I think a formal check may be appropriate, I think there are currently too many inclusion criteria on the WHO theatre checklist (or this is the case at the trust I work in). The process is in danger of becoming a paper exercise (i.e. about “filling the form in”) rather than the doing the actual checks themselves, which is clearly the intended process.”}

“The WHO checklist is a third world response to third world surgeons working with third world anaesthetists in third world hospitals. It is unbelievably tedious, of little value (if you doubt this, independently check your outcomes), and will soon fall into disrepute. Design your own!”

One of the main barriers to elimination of the root causes of wrong site procedures has been identified as a lack of ‘buy-in’ by staff members\textsuperscript{22}. This may be addressed in the future by data showing improvements in safety if and when they become available. However, as yet this has not been the case for the Universal Protocol\textsuperscript{23,24}.

Given that this matter has become a priority for the NPSA, we suggest that there may be benefit from national guidance on how to tackle it. A SALG notice published in November 2010 raises awareness of the issue and emphasises the importance of the correct use of the WHO Surgical Safety Checklist\textsuperscript{25}, and we look forward to hearing further recommendations from the analysis of the SALG online reporting system. We may even wish to consider classifying wrong site blocks as ‘Never Events’ in order to emphasise their significance.

On a local level, as a result of the two cases reported above, our anaesthetic department has adapted the WHO checklist in order to make it more effective at capturing the rare events of wrong site regional blocks. Following feedback from our clinicians, a specific check for block site has been included on the anaesthetic chart and the WHO ‘time out’, which is now completed in the anaesthetic room prior to a regional block being performed. We anticipate that by altering the checklist to make it streamlined and locally appropriate the WHO checklist may become a more helpful and popular tool to ensure patient safety.

Anaesthesia has always been at the forefront of patient safety. As the phenomenon of wrong site regional blockade becomes more widely recognised we hope that the attitudes and practices of clinicians will be instrumental in its prevention in the future.
2 National Reporting and Learning Service. Surgical safety can be improved through better understanding of incidents reported to a national database. National Patient Safety Agency. 2009
3 Edmonds CR, Liguori GA, Stanton AM. Two cases of a wrong site peripheral nerve block and a process to prevent this complication. Regional Anesthesia and Pain Medicine 2005;30:99-103
4 Stanton MA, Tong-Ngork S, Liguori GA, Edmonds CR. A new approach to preanaesthetic site verification after 2 cases of wrong site peripheral nerve blocks. Regional Anesthesia and Pain Medicine 2008;33(2):174-177
5 Harris B, Torlot K. Site marking for peripheral nerve blockade to reduce the incidence of incorrect side regional anaesthesia. Anaesthesia 2009;64:1022-1023
9 Stojadinovic A, Shockey SM, Croll SM, Buckenjaier CC. Quality of Reporting of Regional Anesthesia Outcomes in the Literature Pain Medicine. 10; 6:September 2009 , pp. 1123-1131(9)
12 Bierstein K. Preventing Wrong Site Surgery. ASA Newsletter Aug 2007;71(8)
14 Safe Anaesthesia Liaison Group. Summary of incidents reported to the Anaesthetic E-form project 20 May 2008 to 10 August 2009
15 Email correspondence between H. Simmons and NPSA
22 Greensmith JE, Bosseau Murray W. Complications of Regional Anaesthesia. Curr Opin Anaesthesiol 19:531-537