The ‘How to Guide’ for Reducing Surgical Complications - The role for Pre-Operative Assessment

Including post operative wound (surgical site) infections, adverse events and cardiovascular complications

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Reducing Surgical Complications

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Measures:
(SPI2 code included where appropriate to show overlap)

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<td>(POP2) - Percent on-time prophylactic antibiotics administration</td>
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<td>(POP3) - Percent of known diabetic surgical patients with perioperative glucose control</td>
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<td>Percent compliance with using daily team briefings including the core team</td>
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<td>Percentage of surgical patients who have been assessed for the risk of developing a DVT.</td>
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<td>(POP1) - Percent of eligible surgical patients receiving DVT prophylaxis</td>
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Reducing Surgical Complications

Introduction
Surgery generally is very safe. However, there is the opportunity to improve further the system of care for surgical patients and experts have identified:

a) four ways to reduce the number of infections after surgery,

b) one key way further to improve team work

c) two approaches to prevent cardiovascular events

This guide introduces the interventions which the Campaign team propose will prevent surgical complications as they apply to the pre-operative assessment process. These interventions and measures should be considered for adult patients undergoing elective surgical procedures in the hospital setting. This therefore does not include emergency procedures, outpatient surgical interventions or GP minor surgery. The aspiration is that by implementing these interventions it will prevent many surgical complications and help towards the goal of saving 1000 lives and reducing the harm to patients by 50,000. Trusts do not have to implement them all, or for all surgical patients. They might chose one or two interventions and concentrate on these. In fact we suggest that the team start very small, perhaps with one patient, one surgeon / anaesthetists or one list, see how that goes and then spread this to other teams and lists. All the time checking how it worked, did it make a difference and was it easy to do. Some of these interventions you may well be doing anyway, if so then an ongoing audit of compliance will be the only work the team will have to do.

This guide concentrates on the interventions that either start in or can form part of the pre-operative assessment process (Appendix one).

This guide should be read with the overarching Surgical Complications ‘How To Guide’ and other papers provided by the Campaign e.g. Overall measures, improvement methodologies and other content areas.

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Post Operative Wound (Surgical Site) Infection

Goal: Prevent 50% of post operative wound (surgical site) infections by implementing four components of care:

1. Appropriate use of antibiotics;
2. Use recommended hair removal methods;
3. Maintenance of glycaemic control for known diabetic surgical patients; and
4. Maintenance of postoperative normothermia for appropriate surgery patients.

The importance of preventing post operative wound (surgical site) infection is fully explored in the Surgical Complications How to Guide.

1. Appropriate Use of Prophylactic Antibiotics

For the purposes of the 1000 Lives Campaign, the antibiotic process measures are these (with a goal of 95% compliance):

1. Antibiotics within 1 hour before surgical incision*
2. Prophylactic antibiotic agent consistent with locally determined guidelines
3. Discontinuation of prophylactic antibiotics within 24 hours of surgery

*Due to the longer infusion time required for vancomycin, it is acceptable to start this antibiotic (e.g., when indicated because of beta-lactam allergy or high prevalence of MRSA) within 2 hours prior to incision.

The role for Pre-operative Assessment

Although the antibiotics will not be given until admission there is scope for the preoperative assessment team to identify patients that should receive peri-operative antibiotics (according to local protocols) and to ensure they are prescribed on the medication or anaesthetic chart prior to surgery. This could take the form of pre-writing the medication chart at pre-assessment for countersignature on admission by the medical team.

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2. Use Recommended Hair Removal Methods

Evidence suggests that the rate of post operative wound (surgical site) infection is not influenced by whether hair removal is undertaken or not. If hair is to be removed the method of doing so can affect the post operative surgical infection rate. The limited evidence from a systematic review suggest that the use of electric shavers (clippers) compared to shaving with a razor, reduces the incidents of post operative wound (surgical site) infection (Tanner et al 2006).

For the purposes of the 1000 Lives Campaign, the appropriate hair removal method is:
1. Only electric shavers to be used to remove hair at the site of incision.

The role for Pre-operative Assessment

Patients should be actively discouraged from shaving at or near their surgical site prior to their surgery, especially in the days leading up to admission, even if they are embarrassed about the site of surgery or the amount of hair present at the surgical site. The pre-assessment team could review the site of surgery to assess whether hair removal is likely to be required and to explain that this is best done immediately before surgery, by the surgical team, using special clippers. There are some obvious complications with some patients groups, e.g. axillary surgery in women who usually shave under their arms. Depilatory creams would be more appropriate for this group of patients, although inflammation due to skin sensitively needs to be avoided.
3. Maintenance of Postoperative Glycaemic Control*

Review of medical literature shows that the degree of hyperglycaemia in the perioperative period is correlated with the rate of post operative wound (surgical site) infection in patients undergoing major cardiac surgery (Latham 2001 & Dellinger 2001). Other articles have demonstrated that tight glucose control in surgical intensive care unit patients reduces mortality (Van den Berghe 2001).

*NOTE that, for the purposes of this Campaign, “tight glucose control” is defined as serum glucose levels between 5.0-10.0 mmol/l , throughout postoperative period.

The role for Pre-operative Assessment

The preoperative assessment team should identify clearly to the surgical team any patients that have diabetes to ensure they are monitored appropriately prior to and during surgery. This will also ensure that operating list order reflects the special requirements for surgery in diabetics.
4. Maintenance of Postoperative Normothermia

Recently released NICE guidance reinforces the evidence that maintaining normothermia for all surgical patients is imperative (NICE 2008). It is not unusual for a patient’s core temperature to drop to less than 35°C within the first 30 to 40 minutes of anaesthetic induction. If the perioperative team do not manage this risk throughout the perioperative patient pathway, as many as 70% of patients undergoing routine surgery may be hypothermic on admission to the recovery room. In Wales this could mean nearly 290,000 patients per year (HSW 2007).

If hypothermia does develop then patients can experience increased perioperative blood loss, longer post-anaesthetic recovery, postoperative shivering and thermal discomfort, morbid cardiac events including arrhythmia, altered drug metabolism, increased risk of wound infection, reduced patient satisfaction with the surgical experience and possibly a longer stay in hospital.

The role for Pre-operative Assessment

Pre-operative assessment review has a vital role to play in ensuring that patients are risk assessed for the potential to develop inadvertent hypothermia during surgery and that this is documented.

Patients who have the following risk factors should be identified as being at higher risk of developing hypothermia in the peri-operative period:

- ASA grade II to V (the higher the grade, the greater the risk)
- Likely to undergo combined general and regional anaesthesia
- undergoing major or intermediate surgery
- at risk of cardiovascular complications.

Also in order to ensure that all patients do not loss heat prior to, or during, the transfer to the theatre department, they should be encouraged to wear their own

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warm normal clothing, bed clothing, dressing gowns and slippers for as long as possible. Therefore patients should be informed that they should bring suitable clothing and slippers with them into hospital and to tell a member of staff if they feel cold. Patients being admitted on the day of surgery should ensure that they do not allow themselves to get cold on the journey to hospital, particularly if travelling long distances in cold weather.

**Measure**
The team need to identify a sub group of patients which they are going to use as a pilot for this intervention. These measures are for the team to use internally within the organisation to identify improvements; they do not need to be reported either to the organisations board or the extranet. However they will wish to share them with their peers at the development events.
Prevent Perioperative cardiovascular events

1. Identifying patients at risk and provide appropriate DVT prophylaxis

Death from a Venous Thromboembolism (VTE) has prompted several high profile Department of Health (DH) reports. They indicate there are clear benefits for the implementation of preventative measures for this complication of surgery. They suggest considerable evidence generated from studies in surgical patients relating to the natural history, pathophysiology, diagnosis, screening, appropriateness of surrogate end points and prevention of VTE in surgical patient populations. There is also the increased morbidity associated with DVT and non fatal PE and long term problems from post thrombotic syndrome. Deep vein thrombosis (DVT) occurs in over 20% of surgical patients and over 40% of patients undergoing major orthopaedic surgery (DOH 2007). The prevention of these complications could significantly contribute to the number of lives saved and the reduction in harm to patients e.g. 20% of surgical patients over two years of the Campaign could equate to nearly 165,000 episodes of harm.

The role for Pre-operative Assessment

Pre operative assessment services have a vital role to play in this area, since one of the interventions required is

1. Documented DVT risk assessment of every surgical patient

A Wales-wide DVT risk assessment tool is being developed: until this is available, pre-operative assessment teams should use locally-developed risk assessments for surgical patients. This risk assessment must be documented. It does not have to be an extensive record, and could just be a simple risk identifier e.g. high, medium or low risk.

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If local protocols permit this, appropriate pharmacological and mechanical prophylaxis could be pre-written on the medication chart, for counter-signature by the medical team when the patient is admitted.

**Measure**

All the interventions have process measures, however this intervention is the only one which the measure may be of pre-operative assessment activity. The team need to identify a sub group of patients which they are going to use as a pilot for this intervention. These measures are for the team to use internally within the organisation to identify improvements; they do not need to be reported either to the organisations board or the extranet. However they will wish to share them with their peers at the development events.

**Measure Name**

Percentage of surgical patients who have been assessed for the risk of developing a DVT.

**Operational Definition**

1. Determine the numerator: the total number of patients risk assessed in the pilot population.
2. Determine the denominator: the total number of surgical patients in your pilot population that month.

Calculate the actual percent of eligible patients risk assessed by dividing the numerator by the denominator and then multiplying the resulting proportion by 100.
2. Continue beta blockers for patients admitted on beta blockers

There is good evidence that abrupt withdrawal of beta-blockers is detrimental under most circumstances because of the regulation of the beta-adrenoreceptors that occurs in chronic use. Thus the drug labelling and patient information leaflets state that abrupt withdrawal should be avoided and should only be done on medical advice.

For the purposes of the 1000 Lives Campaign, the beta blockers interventions are:

1. Beta blockers should be continued in patients undergoing surgery who are receiving them to treat angina, symptomatic arrhythmias, hypertension, or other American College of Cardiology/American Heart Association class I guideline indicators.

The role for Pre-operative Assessment

The preoperative assessment team is ideally placed to identify which patients are on beta Blockers and who should continue to receive them (according to local protocols) in the peri-operative period. Consideration could be given to prescribing them on the medication chart for counter-signature by the medical team when the patient is admitted. The patients themselves should be made aware that they may need to keep taking their medication and that they should check with the admitting team.
What You Need to Know about Infections after Surgery:

A Fact Sheet for Patients and Carers

Most patients who have surgery do well. But sometimes patients get infections. This happens to about 3 out of 100 patients who have planned surgery. Infections after surgery can lead to other problems. Sometimes, patients have to stay longer in the hospital. Rarely, patients die from infections. Patients and their carers can help lower the risk of infection after surgery. Here are some ways:

Days or weeks before surgery:
When you meet with someone from your surgical team:
• Bring an up-to-date list of all the medications you take. Talk with your surgeon about why you take each medication and how it helps.
• Let the surgeon know if you are allergic to any medication and what happens when you take it.
• Tell the surgeon if you have diabetes or high blood sugar, or if family members do.
• Talk about ways to lower your risk of getting an infection. This may include taking antibiotic medicines or avoiding shaving near the operation site.

The day or night before surgery:
Take extra good care of your body.
• Do not shave near where you will have surgery. Shaving can irritate your skin which may lead to infection. If it is an area that you usually shave regularly, ask your surgeon if it is okay to do so.
• Keep warm. This may mean wearing warm clothes or wrapping up in blankets when you travel to the hospital. In cold weather, it also means heating up the car before you get in. Keeping warm before surgery lowers your chance of getting an infection.

At the time of surgery:
• Tell the anaesthetist (doctor who puts you to sleep for surgery) about all the medications you take. A good way to do this is to bring a written up-to-date medication list with you.
• Let the anaesthetist know if you have diabetes or high blood sugar, or if family members do. People with high blood sugar have a greater chance of getting infections after surgery.
• Speak up if someone tries to shave you with a razor before surgery. Ask why you need to be shaved and talk with your nurse if you have any concerns.
• Ask for blankets or other ways to stay warm while you wait for surgery. Find out how you will be kept warm during and after surgery. Ask for extra blankets if you feel cold.
• Ask if you will get antibiotic medicine. If so, find out how many doses you will get. Most people receive only one dose before surgery and are on antibiotics for just one day after surgery, as taking too much can lead to other problems.

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• Ask about whether you need to wear special stocking to stop blood clots, and whether you need to have an extra medication (tablets or injections) to aid this.

You can learn more about Post operative Wound (Surgical Site) Infection as it relates to the 1000 Lives Campaign at www.1000livescampaign.wales.nhs.uk
### Appendix One

#### Surgical Complications – the surgical pathway

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<th>Preoperative Assessment</th>
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<th>Anaesthetic room</th>
<th>Theatre</th>
<th>Recovery</th>
<th>Post Op Surgical Ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advise patients not to shave at or near incision</td>
<td>May start Antibiotics</td>
<td>Document Antibiotics administered</td>
<td>Check Antibiotics given before incision*</td>
<td></td>
<td>Discontinue Antibiotics at 24 hours*</td>
</tr>
<tr>
<td>If removing hair only use electric razor</td>
<td>If removing hair only use electric razor</td>
<td>If removing hair only use electric razor*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify if diabetic and notify surgical team</td>
<td>Blood sugar check morning of surgery in diabetics*</td>
<td></td>
<td></td>
<td></td>
<td>Document blood sugar at least daily</td>
</tr>
<tr>
<td>Documented Risk Assess for hypothermia*</td>
<td>Document temp and keep warm / actively warm</td>
<td>Document temperature</td>
<td>Document temp every 30 mins</td>
<td>Document temp every 15 mins</td>
<td></td>
</tr>
<tr>
<td>Transfer to theatre suitably dressed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Documented Risk assess for DVT*</td>
<td>Apply TED stockings</td>
<td>Apply intermittent pneumatic compression device</td>
<td>Use intermittent pneumatic compression device*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administer appropriate DVT prophylaxis*</td>
<td>Apply TED stockings if able to</td>
<td>Apply TED stockings at end of surgery if not already done</td>
<td>Apply TED stockings at end of surgery if not already done*</td>
<td></td>
<td>Mobilise early</td>
</tr>
<tr>
<td>Identify if on Beta blockers</td>
<td>Administer Beta blockers</td>
<td></td>
<td></td>
<td></td>
<td>Continue DVT prophylaxis</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Continue Beta blockers unless very good reason not to*</td>
</tr>
</tbody>
</table>

* suggested process measurement points.
References


Health Solutions Wales Data Extract (10326) Total number of surgical operations, for Welsh residents 2006. Received 27-02-08


Tanner J; Woodings D; Moncaster K. Preoperative hair removal to reduce surgical site infection. Cochrane Database of Systematic Reviews 2006, Issue 3.