

## Checklists save lives

A WHO initiative to encourage surgeons across the world to use checklists when they operate on patients was launched last month. Gary Humphreys reports.

“The woman had severe arthritis and she needed a new knee.” Dr Atul Gawande, writer, surgeon and Associate Professor at Harvard Medical School, tells the story in the matter-of-fact tone of someone who has seen way too many examples of the error he’s about to describe. “She was given an antibiotic and wheeled into the OR [operating room], where she was anaesthetized. The surgeon, for whom a knee replacement was a routine procedure, was about to make the first incision.”

But then he was told to stop. A mistake had been made. It wasn’t life-threatening, but it would have made it impossible to operate successfully and could have resulted in complications – the kind that, according to the World Alliance for Patient Safety (WAPS), a World Health Organization (WHO) initiative launched in 2004, result in around seven million people disabled every year.

“There are roughly 234 million interventions every year – one intervention for every 25 people on the planet,” says Dr Gerald Dziekan, who is WAPS safe surgery project manager in Geneva. “And while there is a clear correlation between economic standing and the number of interventions per capita (for example, in the United Kingdom the ratio is one operation for every eight people) globally speaking, there are no countries without a high rate of mistakes by operating teams.”

Whether it’s a matter of leaving a sponge inside a patient or failing to ensure sterility, more than 60% of patients worldwide have one of six key safety measures missed during surgery. In the words of Gawande, who leads the work to develop this initiative, “what almost happened to the lady with the bad knee could have happened in Amman or London.”

Mistakes occur partly because of developments in surgical procedure and the technology that supports it. “Medicine is becoming more complex,”

says Dr Cyrus Engineer, a member of the WAPS team. “You can have the best of technology, but if you fail to calibrate an instrument that is supposed to tell you the blood sugar level, you are going to get a wrong result which is going to send you down the wrong path.”

“Globally speaking, there are no countries without a high rate of mistakes by operating teams.”

*Dr Gerald Dziekan*

Engineer compares the situation faced by operating room teams with that confronting pilots in civil and military aviation in the 1930s. “The answer was to introduce checklists,” he says, “to break down complex tasks to their component parts, and to ensure

that nothing was left out. It was a process that eventually brought about standardization within the cockpit.”

WAPS launched its Second Global Patient Safety Challenge, Safe Surgery Saves Lives, on 25 June in Washington and it does exactly the same thing – introducing checklists into the operating room in the hope that nothing gets forgotten. A simple one-page surgery checklist, developed in consultation with international experts in surgery, anaesthesiology, nursing and patient safety over a period of 18 months, divides surgical procedures into three phases. In the first phase, the period before anaesthesia, a designated checklist coordinator confirms basics such as the patient’s identity, the type of procedure planned, and whether or not consent has been given. In the second phase, the period after anaesthesia and before surgical incision, the coordinator reviews issues such as anticipated critical events – blood loss, for example – and makes sure basics such as prophylactic antibiotics have been given within an hour before surgery. In the third phase, which occurs during or immediately after



Surgeons operating on a patient in Mauritius.

Harry Anand/WHO

wound closure, but before removing the patient from the operating room, the coordinator checks, among other things, that all instruments are accounted for and that pathological specimens have been properly labelled.

The one-page checklist is currently in its first edition, and is being field-tested in eight hospitals in developed and developing countries spread over the six WHO regions, before being disseminated as a part of a set of WHO guidelines. The safe surgery team has also invited input from operating-room professionals through its web page. Information gathered in this way will be used to produce a final surgical safety checklist, which Gawande believes will be ready for wide dissemination to professional organizations by the end of the year.

To those operating-room teams who have expressed doubts about having to shoulder more paperwork, Dziekan says that the checklist doesn't add any additional workload, and it only takes about three minutes to go through. Other worries might be harder to dispel however. Some practitioners have been resistant to anything that, for want of a better term, might cramp their style. As Dr Albert Wu, a senior WAPS team member and a professor at the Johns Hopkins Bloomberg School of Public Health puts it: "Some surgeons believe that a checklist dumbs things down and actually worsens the practice of a really expert practitioner."

“They had failed to make sure that a replacement was available in her size, but, thanks to the checklist, they realized the problem before opening her up ... That surgeon was converted.”

Dr Atul Gawande

Realizing that it is precisely those practitioners who need to be won over, Gawande and the WAPS team have

**World Health Organization SURGICAL SAFETY CHECKLIST (FIRST EDITION)**

**BEFORE INDUCTION OF ANAESTHESIA**

**SIGN IN**

- PATIENT HAS CONFIRMED
  - IDENTITY
  - SITE
  - PROCEDURE
  - CONSENT
- SITE MARKED / NOT APPLICABLE
- ANAESTHESIA SAFETY CHECK COMPLETED
- PULSE OXIMETER ON PATIENT AND FUNCTIONING

**DOES PATIENT HAVE A:**

KNOWN ALLERGY?

- NO
- YES

DIFFICULT AIRWAY / ASPIRATION RISK?

- NO
- YES, AND EQUIPMENT / ASSISTANCE AVAILABLE

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?

- NO
- YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

**BEFORE SKIN INCISION**

**TIME OUT**

- CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE
- SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM
  - PATIENT
  - SITE
  - PROCEDURE

**ANTICIPATED CRITICAL EVENTS**

- SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?
- ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS?
- NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?

HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?

- YES
- NOT APPLICABLE

IS ESSENTIAL IMAGING DISPLAYED?

- YES
- NOT APPLICABLE

**BEFORE PATIENT LEAVES OPERATING ROOM**

**SIGN OUT**

NURSE VERBALLY CONFIRMS WITH THE TEAM:

- THE NAME OF THE PROCEDURE RECORDED
- THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)
- HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME)
- WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED

SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

First edition of WHO's surgical safety check list (available at: [http://www.who.int/patientsafety/challenge/safe\\_surgery/comptest\\_form/en/index.html](http://www.who.int/patientsafety/challenge/safe_surgery/comptest_form/en/index.html)).

been focusing on demonstrating its value in settings worldwide and on seeking the endorsement of professional organizations in the hope that this will bring broader acceptance among practitioners. So far, one of the most ringing endorsements has come from the United Kingdom's (UK) National Patient Safety Agency, the Royal Medical Colleges and other professional medical associations in that country. "The UK is the first country to have embraced this concept so broadly," says Gawande, "and by doing so, has established itself as a worldwide leader in the perfection of surgical care."

Other countries with a broad base of professional societies and hospitals are getting behind the checklist (including Jordan, Thailand and the USA) while hospitals in China and in countries in Latin America, according to Gawande have already begun using versions of the WHO checklist that they have translated themselves to improve surgery outcomes. Since WHO began seeking endorsements back in February this year, over a hundred societies worldwide in 30 of WHO's 193 Member States have climbed aboard, a result Pauline Philip, the Executive Secretary of WHO's Patient Safety Programme which runs WAPS, considers "a huge success". Meanwhile, Gawande is talking about a potential 250 hospitals using the checklist by the end of this year, and 2500 of them using it by the end of 2009.

Such optimism derives from the stunning results that have already been achieved, most notably in a study conducted by Dr Peter Pronovost – one of the most enthusiastic advocates of the checklist approach – at Johns Hopkins hospital in Baltimore, USA. Pronovost, a critical-care specialist, found that the introduction of a simple five-step checklist reduced the rate of blood-stream infections caused by intravenous lines by two-thirds, while, on average, intensive care units cut their infection rates from nearly 3% of patients treated to zero. During the 18 months of the programme, an estimated 1500 lives were saved in the US state of Michigan alone.

Checklists worked for Michigan and they worked for the lady with the bad knee. Gawande was told the story by the surgeon who had been about to open the lady up, a surgeon who had been opposed to the checklist initiative before that day in the operating room. And what was the problem the checklist procedure revealed? "The hospital was out of artificial knees," Gawande says. "They had failed to make sure that a replacement was available in her size, but, thanks to the checklist, they realized the problem before opening her up. The operation was delayed until the knee prosthetic could be obtained on the same day and the operation continued. That surgeon was converted." WHO hopes there will be millions more like him. ■

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