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Experience With a Portable Anaesthetic Machine Following the April and May 2015 Earthquakes in Nepal
The World Anaesthesia Society is offering a grant of up to £1000 for trainee anaesthetists wishing to work or teach in a developing country. Application and award of these grants will be through the travel grant system run by the International Relations Committee of the AAGBI with two grants awarded each year.

Further information and application forms available at www.aagbi.org
Welcome to World Anaesthesia News

Welcome to the first World Anaesthesia News of 2016, and as we write this editorial it is already April – unbelievable!

We start with an update on an exciting day at the World Anaesthesia Society seminar held at Portland Place last November. This proved to be a full, well attended day with some fascinating sessions. The discussions on some very topical subjects, such as the Lancet Commission and the role of the WFSA in advocacy for safe anaesthesia worldwide, the International threat to the restriction of Ketamine, and the challenges and experience of working in Syria, were truly excellent. We also heard about many successful programmes such as Lifebox, the SAFE obstetric course, the Zambia Anaesthesia Development Partnership, and the Gondar MSc project. There are so many opportunities to work overseas in Developing Countries as demonstrated by such a varied programme that if this whets your appetite then we would really encourage you to look at the WAS trainee seminar planned for 23 May 2016.

Following on from the Ketamine debate, Niki O’Brien has written an excellent article explaining the WFSA’s campaign to raise awareness on the medical uses of ketamine and the impact international restrictions will have on millions of patients around the world. We also feature an update from Nicholas Owen, the inaugural Lifebox/AAGBI Fellow, and a remarkable feat from Tom Poyser who set up a CPAP protocol and service in Ethiopia and is keen to share his experience! Stephanie Hayes is a Physician’s assistant in Anaesthesia and an ODP who went to Kenya to support trauma services with the Kenya Orthopaedic Project, and Caroline Järte tells us about her experience with a portable anaesthetic machine following the Nepalese earthquakes courtesy of Safe Anaesthesia Worldwide.

Phew……so much packed in to 28 pages, plus adverts for some invaluable courses and projects – well worth a read, and well worth sharing and encouraging more friends and colleagues to join and hear about what is going on in World Anaesthesia!

Sarah O’Neill and Gordon Yuill
Editors

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World Anaesthesia Society update

The WAS annual seminar, “Access to safe surgery in low and middle income countries” was held at the AAGBI in November.

The first session, entitled “A global perspective” featured updates on the Lancet Commission and the role of the WFSA in advocacy for safe anaesthesia worldwide. Both of these have been featured in recent issues of World Anaesthesia News. We were reminded of the sobering fact that five billion people in the world are without access to safe and affordable anaesthesia and surgery. However, we were also reminded that through the WFSA, anaesthetists can have a remarkably unified and strong voice. Examples would be the WFSA’s ketamine campaign, and its statement to the WHO before the passing of the resolution “strengthening emergency and essential surgical care and anaesthesia as a component of universal health coverage”. There was lively debate after this thought-provoking session. It seems that inequities in access to anaesthesia and surgery across the world are finally being recognised, and there is real opportunity for change. Excting times.

Session 2 was a debate entitled “Ketamine is a dangerous drug and the WHO are correct to ‘schedule it’ to limit its use”. An initial show-of-hands demonstrated that the entire room was against the motion. Angela Cottrell, a consultant urologist who was proposing the motion, therefore found herself with an uphill struggle to persuade us otherwise! I suspect I speak for many when I say that I was previously quite ignorant of the urological complications that can occur with heavy ketamine use.

We learnt that ketamine is the most common drug of abuse in Hong Kong and Southern China, and Angela showed us evidence that a significant number of ketamine users in China have severe urological problems as a result. Ben Gupta opposed the motion, arguing that ketamine is not dangerous unless it is grossly misused, that its safety profile in anaesthesia is well-established, and that its removal would deny many of the world’s population access to safe general anaesthesia and indeed to analgesia. The motion was rejected unanimously. However, a secondary motion, “Who now feels better informed about why ketamine is a potential public health hazard?” was voted for by all.

The afternoon was devoted to updates on sustainable projects. Nick Boyd gave an update on the Lifebox project (featured in WAN 14.1). Over 10,000 of the distinctive yellow pulse oximeters have been sent out to over 100 countries. The organisation is also beginning to focus on ways to reduce surgical site infections. Six month Lifebox fellowships are now available, and we have a report from the first Fellow in this issue. We also heard from Nick about the SAFE courses (Safer Anaesthesia from Education). Many people are aware of the SAFE obstetric course, but there is now also a SAFE paediatric course focusing on the management of common paediatric procedures along with pain management and paediatric drug doses. There are also SAFE Fellowships available, along with further SAFE faculty courses for those interested in teaching on the courses. For more information see the SAFE section of the AAGBI website.

We also heard an update on the Zambia Anaesthesia Development Partnership (featured in WAN 14.2). It was good to hear that the project is flourishing. The team are keen to encourage more junior trainees to get involved, so do get in touch with them if this is something you may be interested in.

The Gondar MSc project is also running well. There have been 15 graduates so far, all of who remain working in anaesthetics. The project is not yet fully “sustainable”, as it remains very reliant on tutors from overseas, principally the UK. However, the recent graduates are gradually taking on more of the teaching responsibility which is great to hear.

In the final session of the day, Rola Hallam spoke to us about the challenges of working in an active war zone. She told us of some of her experiences working in Syria. Her story acted as a sorry reminder of the world’s inertia in the face of a growing humanitarian catastrophe. She spoke of the difficulties of working in a perpetually acute, hostile environment, particularly in view of the targeting of healthcare that now seems to be happening in conflict. She gave us an idea of the difficulties of coping with frequent mass casualty events, along with increasing endemic disease and public health problems. It was a sobering end to the day, and it is easy to feel overwhelmed by the scale of the problem. However, Rola shared some sage advice from one of her relatives: “Just do your bit and do it well. If you look at the enormity of the problem it will blow your mind, and then you’re no good to anyone”. Wise words indeed.
Trainee anaesthetists in the developing world: where to go and how to organise it?

What to know before you go...
Tales from afar
How to make an impact on your return

AAGBI 21 Portland Place, LONDON
Book now via AAGBI website
5 CPD points
The WFSA launches a global campaign to fight for the neglected surgical patient as the UN Commission on Narcotic Drugs considers internationally restricting medical ketamine

As most anaesthetists will know, when performing surgery in many parts of the world, there is no choice: ketamine is often the only anaesthetic at hand and by far the most commonly used. Unlike other anaesthetics, ketamine does not require a reliable electricity supply, oxygen, highly trained staff, or monitoring systems to administer. That makes it the only safe form of anaesthesia in many poorly resourced hospitals and medical centres and in conflict and disaster areas. It’s also used widely in high resource hospitals as an accompaniment to other anaesthetics.

Globally there are already 5 billion people without access to safe and affordable anaesthesia and surgical care when needed. This figure could rise dramatically if China succeeds in a campaign to have the UN Commission on Narcotic Drugs (CND) internationally control ketamine.

This push for policy change stems from the illicit production and abuse of ketamine in China. Ketamine is in fact the most popular recreational drug in China and a small number of neighbouring countries. However it does not cause significant social harm on a global scale, ranking the 16th most popular drug in the 2014 Global Drug Survey, and often not appearing in the ‘Top 20’ list in individual countries.

In 2015 the UK government upgraded ketamine from a Schedule 4 to a Schedule 2 Controlled drug, resulting in tighter restrictions on its storage and records of its use. Fortunately the UK health system has the mechanisms in place to avoid disrupting access to it for those who need it.
place to ensure staff can adhere to these regulations and still ensure that doctors and their patients have access to essential medicines. However, if ketamine is made a controlled substance by the UN CND, countries without such developed health systems will struggle to meet these requirements, risking a chain of events that are likely to result in a drastic reduction in the manufacture, distribution and availability of medical ketamine.

When morphine was similarly scheduled in India, staff became afraid of possible legal repercussions of giving morphine to their patients, and so stopped prescribing it. This resulted in medical use dropping 97%. As morphine was no longer given; it was no longer manufactured, creating a chronic shortage of this essential medicine.

As the foremost global alliance of anaesthesia providers, the World Federation of Societies of Anaesthesiologists (WFSA) has taken the lead in a global campaign to challenge the threat to ketamine access.

A multimedia, multinational approach

The WFSA launched a Ketamine Campaign Resource Hub at the end of 2015 to raise awareness about the legislation being considered, and allow anaesthetists and medical staff around the world to voice their opposition. Interested parties can use the online tools to learn more about the crisis and take action to prevent ketamine being scheduled.

The Ketamine Resource Hub is centred around an interactive map that shares stories, in different languages, from anaesthetists and medical professionals around the world. And it is truly global.

"Today I needed ketamine as a premedication, so I could calm a girl with behavioural problems so that she was able to have anesthesia induced without physically attacking her parents. Two other drugs had been tried and failed (or made behaviour worse). Ketamine allowed her to be anesthetized without a level of restraint that could have harmed her and also others," shared Dr Dylan Bould from Ottawa, Canada.

"Ketamine is irreplaceable. After super typhoon Haiyan devastated our city Tacloban, ketamine was one of the few drugs we had and we were thankful that we had it in our hospital," Dr Angelina Gapay shared from the Philippines.

The WFSA believes that collecting anecdotal evidence on the importance of ketamine as a medical drug will add weight to the quantitative data.
accessible to the UN CND on the prevalence of ketamine use in hospitals and medical centres internationally, along with the recent recommendation by the WHO Expert Committee on Drug Dependence (ECDD) that ketamine remain unscheduled (the fourth time the ECDD has made this recommendation since 2006).

Another key action of the campaign is to harness the power of social media to raise even wider awareness among the medical community, global health advocates and decision makers, and unite them in opposition under the hashtag #KetamineIsMedicine.

On the 1st/2nd December 2015 the #KetamineIsMedicine hashtag was launched on Twitter and Facebook and reached an incredible audience. With support from more than 50 countries, 317,734 Twitter accounts reached and 26,738 people reached on Facebook, it became clear that this is something that the global health community are truly passionate about.

**Winning the battle, but still fighting the war**

The UN CND will meet in Vienna on 9th-17th March to decide whether or not to restrict ketamine, so there is still a great deal of work to be done.

One important objective of the WFSA is to encourage national and global decision making that promotes the availability of safe and high quality anaesthesia and effective pain relief. As the March decision draws closer the WFSA will continue to raise global awareness and share more stories on the medical uses of ketamine, but more importantly, the impact international restrictions will have on millions of patients around the world.

For more information about the Ketamine Campaign please visit www.wfsahq.org/ketamine.
I had the privilege of being the inaugural Lifebox/AAGBI Fellow for six months from August 2015. So what is the Lifebox Fellowship and why did I want to undertake it? In short it is an opportunity for a post FRCA (ST5+) UK anaesthetics trainee to experience developing world anaesthesia in, as things currently stand, Ethiopia or Uganda. In fact, two more SAFE Fellowships (Safer Anaesthesia From Education) have been created this year in Kenya and Malawi, with trainees appointed to all four posts. Exciting times and excellent news for the sustainability and continuity of improvement projects in these hospitals. It is clear that spending professional time abroad is beneficial for both us as trainees and the NHS upon our return. Additionally, I missed the travelling experiences of my pre and immediately post university years that became a distant memory once the rigours of postgraduate medical training and examinations took hold of my life. Combining those two points made the decision to apply for the Lifebox Fellowship a fairly easy one in all honesty.

Lifebox is a non-governmental organization (NGO) devoted to promoting safer surgery in the developing world. Whilst originally focusing on distribution of pulse oximeters, the remit has spread somewhat over its short but productive lifespan. Lifebox celebrates its 5 year anniversary.
this year and given the high-profile nature of the founding bodies; Association of Anaesthetists of Great Britain and Ireland (AAGBI), Brigham and Women’s Hospital, Harvard School of Public Health and WFSA; it is perhaps not surprising how successful it has proved in such a short period of time. Lifebox has reached out to no fewer than 100 countries, training over 5000 health care professionals and distributing over 10000 pulse oximeters

My only strictly-defined role was that I was to treat the new anaesthesiology residents as my number one priority. They had something of VIP status in the grand scheme of anaesthesiology in Ethiopia, being the first residents outside of Addis Ababa in the country. To clarify, there are only 30 anaesthesiologists in the whole country and only two of those reside outside Addis; in Jimma in fact. The acquisition of trainees to Jimma was the result of decades of effort on the part of the anaesthesiology department. The flip side of this was that there was no formal curriculum and no structured teaching so I was pretty much starting from a blank canvas.

Teaching & Clinical
Striking a balance between teaching what a Western trainee anaesthesiologist might expect, and indeed need, to learn and what is practical and necessary for an Ethiopian anaesthesiologist is difficult. I started teaching practical procedures that might seem like bread and butter to developed world anaesthesiologists but are not readily performed out there. Central lines and epidurals are a case in point. Despite theory and practical sessions one fundamental problem repeatedly surfaced; the complete lack or inconsistency of equipment and allied health professional training that made implementing these newly taught skills challenging. Unfortunately the old see one, do one, teach one adage all to often falls after the see one stage in this set up.

Despite the difficult in implementing newly taught skills the residents displayed considerable enthusiasm during the teaching sessions. One can only hope there will come a time in the future, either in Ethiopia or on a foreign rotation where these skills are more readily utilised and developed. (One of the residents secured a sponsored training programme in Israel during my period in Jimma. Whilst excellent news for him it did reduce the Jimma anaesthesiology trainee contingent by 33%!) Regular teaching to the ICU nurses was also a self-appointed remit of my placement to try and address some of the issues highlighted above.

Clinically the experience was highly varied. There was perhaps less hands on clinical experience than I was expecting as my clinical exposure was almost exclusively done in the context of supervising the trainees and so, by definition, was more hands off. However, the advanced pathology caused by the multifactorial delayed presentation means you will see cases you just don’t see back home. From advanced maxillary facial tumours presenting considerable airway challenges (and miraculously a fibreoptic scope from somewhere) to spontaneous, seminar room cardioversions with an aged defibrillator and incredibly sick paediatric cases, too often with tragic outcomes. Hopefully some of the pictures in this piece will give you a flavour of what you could expect but in truth you can only really expect the unexpected.

NGOs
Being on placement under the umbrella of Lifebox as well as Operation Smile, which had an overlapping role in organisational aspects of my Fellowship meant that I was exposed to processes and experiences I could not have otherwise hoped for. There is very much a bigger picture in the developing world of global health care policy implementation, and the insight into the considerable complexities of how this is implemented was an unexpected bonus of my Fellowship. Without going into detail I was introduced to GE Foundation who kindly invited me as the Lifebox representative to the Health Sector Transformation Plan (HSTP) meeting in Adama, just outside of Addis Ababa to witness the unveiling of the next 5 year plan to transform the healthcare...
sector in Ethiopia. GE Foundation launched their Safer Surgery 2020 initiative, committing an impressive $25 million to their own five year project. The implementation of this initiative also involved other policy and strategy firms such as Dalberg and the non-profit health organisation affiliated to Johns Hopkins University, Jhpiego. I had the pleasure of meeting representatives from all these bodies and as each day went by began to realise just how difficult and multilayered the process of implementing change, let-alone improvement, in a developing world healthcare setting is.

Lifebox Distribution
As a Lifebox Fellow it was perhaps inevitable I would undertake a Lifebox distribution and education workshop at some point. Despite not being prearranged the opportunity did present itself in Hawassa, an Ethiopian town not far (geographically at least) from Jimma. My role here was to integrate the components of the Lifebox teaching and evaluation programme into a simultaneously running surgical and anaesthetic training course from a Welsh-based consultant contingent.

A lot of improvisation and adaptation was required but ultimately a very rewarding distribution was obtained, along with a particularly colourful jacket. It’s difficult to know how to sum up my six months in Ethiopia. In many ways it was exactly what I expected and yet entirely unpredictable at the same time. Would I recommend it to others? Categorically yes, but with significant caveats. Firstly you have to be comfortable with the improvisation and frustrations that will be necessary to maximise your time in a developing world healthcare setting. Secondly, your personal circumstances need to fit in; marriage, children and a mortgage could make this a challenging OOP. Thirdly your financial circumstances need to fit in. Despite offering arguably the most generous stipend of the developing world fellowships that are available it will still represent a massive pay cut and your financial commitments back home are unlikely to be sympathetic to your change in circumstances. Having said all that, I sincerely doubt I will have a more formative six months in my anaesthetic training and I would urge all senior anaesthesiology trainees to consider a developing world stint; more and more seem to be cropping up all the time.

Anaesthesia in Developing Countries Course

Equipping anaesthetists for work in the developing world

Held in Kampala, Uganda

This annual residential five-day course offers the opportunity for anaesthetists from high-income countries to learn about the specific challenges of working in resource-poor environments. It has run for over thirty years in Oxford and Uganda and is particularly recommended for those planning visits to the developing world in short and long-term contexts.

The registration fee includes accommodation, food and transfers as well as the conference costs. Flights are not included.

To be added to the mailing list for early notice of course dates please email events@ndcn.ox.ac.uk.

Further information:  www.nda.ox.ac.uk
                  www.oxfordanaesthesia.org.uk
From August 2015 to July 2015 I was in Ethiopia working for Voluntary Service Overseas. This posting had several duties in anaesthesia and intensive care medicine. During the year I utilised CPAP for the post-operative care of several individuals. It was remarkably successful and so I replicated this in the context of an intensive care setting. The purpose of this article is to disseminate the experience and share the protocol that I used. This is so that it can be adopted to other contexts where it may be appropriate.

Experience One: Post op anaesthetic care

Case: Approximately two year old child. He had a traditional uvullectomy then was admitted with fever, shortness of breath and impending respiratory failure. This was thought to be due to a post-procedure pharyngitis. A gas induction with 100% oxygen and halothane was performed. Direct laryngoscopy showed a normal pharynx (with no uvula) and a normal laryngeal inlet. The patient was then paralysed with suxamethonium and intubated. The surgeons then explored the pharynx and no intervention was necessary. The ETT was full of purulent secretions and was suctioned out. This left the working diagnosis of a severe aspiration pneumonia from the post procedure bleeding. Having taken over ventilation the child could not make sufficient respiratory effort once the suxamethonium had worn off. He was given antibiotics, two fluid boluses, kept warm, and

More bang for your buck. How CPAP can improve mortality in austere environments

Tom Poyser

ST5 Anaesthetics
North West Deanery

Links:
VSO website: http://www.vsointernational.org/volunteer/professional/types-of-volunteer-job/health/anaesthetists
BASICS website: https://www.aiic.cuhk.edu.hk/web8/BASIC.htm
supported with CPAP through the endotracheal tube for about an hour.

The hospital had no way of looking after intubated patients. The child was then extubated, but with nasal canulae rapidly deteriorated. With CPAP via a face mask he was able to remain saturated (even with low concentrations of supplemental oxygen). A spare anaesthetic machine was used in the corridor near the recovery room and a post-op CPAP mask manufactured out of a Jackson Rees circuit and a face mask. High flow oxygen and air with a small amount of CPAP was used. The child stayed this way for 24 hours, and then needed nasal oxygen followed by normal ward care. He left the hospital a week later.

Experience Two: Post Thoracotomy
There had been several thoracotomies for patients with TB. This was for volume reduction; they had been brought to the hospital due to extreme breathlessness and were now oxygen dependent. They had all developed respiratory failure post op and there had been two deaths prior to my arrival. After a similar case the patient developed respiratory failure. They were placed on CPAP using the same system as above. The Jackson Rees circuit was used but an adult two litre reservoir bag was substituted. His respiratory failure resolved and he made it back to the ward.

He died of the consequences of his tuberculosis ten days later.

Experience Three: ICU care
The second project that I was involved in was developing an adult ICU in another hospital. In this hospital pneumonia was the number one cause of mortality. In the ICU the respiratory support that could be offered was low flow oxygen from a concentrator or high flow oxygen from a cylinder. With the hospital, Voluntary Service Overseas, the BASICS collaborative and Glan Clwyd NHS Hospital (a link hospital in the UK) I established an ICU. After several months it became apparent that the ICU staff were capable of providing the appropriate care to patients requiring respiratory support. There were 3 Philips Respironics V200 ventilators that had been provided to the government and placed in the hospital. There was technical difficulty in utilising the ventilators as the oxygen connections were not compatible with Ethiopian cylinders, and also there were no step down regulators so the internal valves of the ventilator would have been damaged. The solution was to use a carbon dioxide sample line to enrich the circuit from a cylinder. I developed a protocol and trialled it on our first patient. She was a 30 year old female who presented with shortness of breath and signs of typical measles (peri-auricular rash/conjunctivitis). She was treated with fluids, intravenous antibiotics and nasal oxygen at 4L/min via oxygen concentrator. The original chest X ray showed bilateral infiltrates through all zones. She deteriorated and her saturations were 60% on the ward. She was brought to ICU where her admission vital signs were: respiratory rate 45, oxygen saturations 85% on 15L high flow oxygen, pulse 145, BP 100/45. There was no improvement so CPAP commenced with immediate improvement. She made steady progress and was weaned off at day 6.

Given this success we continued to use the protocol. It has so far been used on 8 patients with a high success rate.

Overleaf is the protocol that I used. Part of it is technical instructions about the ventilator and how to protect it. It has been slightly modified as the names of the trained staff have been removed. Otherwise it is exactly the same as the one in use. As part of the development of the protocol I initially had the CPAP and oxygen being started low and stepped up. As I was closely supervising the first patients this wasn’t a problem, but I felt for independent use by the nurses, they should start with high levels of support and come down.

There was an extremely high burden of respiratory disease in both of the hospitals I worked. Most of the patients had lots of cardio-respiratory reserve and the very simple intervention of CPAP made a near terminal illness into a survivable one.

Table 1: Context Specific Advantages of using CPAP instead of invasive ventilation in this context.

<table>
<thead>
<tr>
<th>CPAP</th>
<th>Invasive ventilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remains spontaneously breathing in case of power cut. High flow oxygen from cylinder as a backup option.</td>
<td>Patient totally dependent on ventilator. Would need bagging for long periods in prolonged power cut.</td>
</tr>
<tr>
<td>No need for sedation for tube tolerance</td>
<td>Need for sedation. No infusion pumps Limited opiates (patients required to purchase them)</td>
</tr>
<tr>
<td>Spontaneous movement</td>
<td>Fully dependent. No heparin for VTE prophylaxis</td>
</tr>
<tr>
<td>Clinical assessment easier.</td>
<td>Less easy to clinically asses, no blood gases currently available.</td>
</tr>
<tr>
<td>Patient can still eat food provided by the hospital &amp; family during CPAP breaks</td>
<td>NG feed protocol very expensive for patients.</td>
</tr>
<tr>
<td>Use of ventilator for high flows and pressure cut costs of using high flows of compressed oxygen. Also there is no high flow medical air available in Ethiopia</td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Case series of patients treated with CPAP in the Nigist Elani Mohammed Memorial Hospital in Hossana, Ethiopia.

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Diagnosis</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>M</td>
<td>Pyogenic meningitis &amp; aspiration pneumonia</td>
<td>Discharged home</td>
</tr>
<tr>
<td>20</td>
<td>M</td>
<td>Gangrenous small bowel obstruction. Had dependent atelectasis bilaterally</td>
<td>Discharged home</td>
</tr>
<tr>
<td>30</td>
<td>M</td>
<td>Laparotomy with ileo-sigmoid knotting with basal atelectasis</td>
<td>Discharged home</td>
</tr>
<tr>
<td>40</td>
<td>F</td>
<td>Septic shock post laparotomy. Basal atelectasis. Needed inotropic and</td>
<td>Discharged home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>oxygen therapy. Respiratory parameters didn’t respond to oxygen alone.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved after CPAP</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>M</td>
<td>Perforated ileum on a background of COPD. CPAP used on the fourth day for</td>
<td>Discharged home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>respiratory failure</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>F</td>
<td>Measles pneumonia. Required respiratory support for 6 days (see case</td>
<td>Discharged home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>studies)</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>M</td>
<td>Post laparotomy for ileoecal intussusception. Developed respiratory failure</td>
<td>Discharged home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>on day 3</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>F</td>
<td>Severe CAP – left on the ward for 3 days. Brought to ICU as part of resus</td>
<td>Died after 5hrs of admission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>effort.</td>
<td></td>
</tr>
</tbody>
</table>

**CPAP PROTOCOL**

**DO NOT USE CPAP UNLESS YOU HAVE BEEN TRAINED**

**Indications**

- Respiratory failure not responsive to oxygen therapy alone.
- Any evidence of atelectasis/collapse.
- Must have patent airway.

*Eg:*
- Pneumonia.
- Exacerbation of COPD.
- Post op respiratory failure.
- Heart failure.
- Acute pulmonary oedema.

**Contraindications**

- Must be co-operative (not confused or unconscious).
- Not for asthma.
- Not for TB (will contaminate equipment and is an infection risk).
- No untreated pneumothorax (if possible get CXR).
- Not for upper GI surgery.
- Copious secretions requiring frequent suctioning.

**Prepare the patient**

- Discuss with them.
- Warn them it will be unpleasant (hot, tight fitting mask).
- Check fitting of mask.
- Place cradle behind their head.

Wait until ventilator ready until connecting.

**Prepare the Ventilator**

Plug in ventilator to voltage regulator.

**THE OXYGEN IS SUPPLIED INTO THE MASK NOT THE VENTILATOR.**

- This is to protect the ventilator. The cylinder needs a pressure regulator which is not available in Hossana. The cylinder has a fitting which is not compatible with the ventilator.
- THE VENTILATOR WILL ONLY SUPPLY AIR (21% oxygen) without external oxygen attached to the mask.

Attach oxygen to the mask (via angle piece connector). Turn oxygen flow to 15. Turn on the ventilator. Set to NPPV mode (Non-invasive Positive Pressure Ventilation).

Set IPAP (Inspiratory Positive Airway Pressure) and EPAP (Expiratory Positive Airway Pressure) both to 5.

BECAUSE THE VENTILATOR IS NOT ATTACHED TO OXYGEN IT NEEDS TURNING TO 21%.

THIS WILL STOP IT ALARMING.

Attach mask to cradle

Monitor patient: Sats  RR  Pulse  BP

**WARNING** – CPAP can worsen BP due to rise in intrathoracic pressure.

**Titr在 to effect**

- 2 variables.
- CPAP (both IPAP and EPAP must be set to the same).
- Oxygen concentration.
- There is no way of monitoring PAO2 or PACO2 so titrate to Sats and clinical effect.

CPAP upper limit = 10cm H2O.

Target oxygen sats of > 90%:
- Start oxygen at 15L and wean down.
- Start CPAP at 5 and titrate up.
- The higher the CPAP the less well it will be tolerated by the patient.

**Oxygen**

Wean down by 2.5L/min increments  
**Minimum = 5**

**CPAP**

Increase to 7  
Increase to 10 (MAX)

The final settings will depend on what is best tolerated by the patient and keeps their Sats > 90%. Example. CPAP 7, oxygen 10L/min.

Maximum CPAP 10cmH2O and Maximum oxygen 15L.

**If possible give a 15 minute break every 2 hours.**

- Must be on oxygen
- Eat, drink, look for pressure ulcers.

Patients with pneumonia may take 4-5 days to improve. If therapy is failing and patient becomes palliative remove mask and ventilator. It is unpleasant to die whilst CPAP is ongoing.
An intensive one day course covering the basics of anaesthetic practice for developing countries and resource poor environments. Suitable for all grades of anaesthetist.

- Ketamine
- Draw-over anaesthesia
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Delivering trauma services in Kenya - a personal account

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In November of 2014 I was privileged to join a group of UK healthcare workers as an Operating Department Practitioner (ODP), offering surgical support as part of a Kenya orthopaedic project (KOP) team.

In 2012 a link was formed between Nanyuki and Torbay hospitals, the partnership formed from the activities of General Practitioner, Dr Lucy Obolensky. Since the 1990’s Lucy has been working in the rural Kenyan communities of Laikipia county and has experienced first-hand the devastating effects of neglected fractures.

Surgical intervention for treatment of traumatic bone injuries in low and middle-income countries (LMIC) like Kenya is an expensive and therefore largely inaccessible service. Without treatment patients may be condemned to a life of disability, with the ensuing loss of income and vital ability to provide for oneself and family.

In 2008, the World Health Organisation identified trauma as a leading cause of worldwide mortality, but despite this the local government and very few non-governmental organisations offered trauma and orthopaedic support.

In 2009, Dr Lucy Obolensky worked with Nanyuki surgeon Dr Samuel Ndanya to run the first of many Kenya orthopaedic projects (KOPs), partially funded by the UK charity Medical and Educational Aid to Kenya (MEAK). Lucy also set up her own charity, Exploring Global Health Opportunities (EGHO) a registered UK based charity ‘committed to the development and maintenance of relieving sickness, preserving health and advancing health and social education’ with the help of Consultant anaesthetist Dr Kerri Jones.
The chair of the charity is Consultant Anaesthetist Dr Matt Halkes and the project manager is Dr Ellie Gregory, a junior doctor from Torbay Hospital who is currently based in Nanyuki. EGHO funds both hospital-based and community activities in Laikipia County, and this has been supplemented over the last 3 years by a Department for International Development grant.

Over the last seven years the collaborative work of the UK team with their Kenyan colleagues has led to the development of many projects based around the trauma pathway. These include community first aid training, trauma training for hospital staff, opening of an Emergency Department in Nanyuki Hospital, training and kit donations with the aim of improving definitive surgical care and post-op rehabilitation. One of the most successful training packages developed through the partnership is the GRASP IT (Global Recognition and Assessment of the Sick Patient with Initial Treatment) course.

Optimising patient safety forms the basis of ‘GRASP IT’ and similar to those principles of the UK ALERT course, which is aimed at improving the recognition and treatment of the deteriorating patient among multi-professionals.

**Nyahururu**

Nyahururu is a town with an urban population of 36,000 within a region mainly known for agriculture, horticulture and tourism, as well as being home to the famous Thompson Falls. This was the first visit to Nyahururu and its 142 bedded, 2 theatre District Hospital by a KOP surgical team, following delivery of a GRASP-IT course the week prior to our visit.

Our team comprised of two surgeons, two anaesthetists, five operating department practitioners and nurses, three physiotherapists, a radiographer, health care assistant, medical electronics engineer, project manager and project administrator. On our arrival the appreciation of our visit became immediately apparent, a banner displaying the warmest of welcomes, shortly followed by a welcome and ‘greetings’ lunch. This allowed a relaxed opportunity to introduce ourselves, with the forming and building of relationships among our local Kenyan colleagues being as much a priority as the provision of our surgical support.

We brought with us our own instruments, consumables, prosthesis etc from the UK (in 18 suitcases; a somewhat unique airport experience). The week began with the surgeons, anaesthetists and physiotherapists commencing an extremely busy clinic, assessing and prioritising patients for the week ahead. Meanwhile, the theatre team familiarised ourselves with the working environment and prepared our work areas accordingly. Although the clinical environment and running of theatre was similar in some ways to the UK, there were also many differences. Much effort was made by the local team to maintain cleanliness of the work environment. There was
no ventilation system however and although we had water and electricity, water supply would on occasions cease without warning. We adapted outside the theatre for recovering patients but it was not existing practice to have a staffed recovery area. The anaesthetic machines were far newer than I had expected however our fluid warmer consisted of a hose and bucket, placing bags of fluid in warm water. The nurse’s hand made their swabs (non radio-opaque) on the theatre coffee table. Suction tubing was reused following a soak in cidex plus a rinse.

During our visit a total of 218 outpatients were assessed, with more than 100 receiving consultations from the physiotherapy team, including well attended (and fun!) group back and joint pain sessions. Over a five day period we performed 23 operations ranging from hip hemiarthroplasty to soft tissue and tendon repair, with a number of upper and lower limb fracture fixations. The effects of the project ranged from patients with neglected tibial fractures regaining their ability to walk unaided, to the removal of a young girls excess thumb who otherwise might have been exposed to a lifetime of potential outcast, the influence evident from her smile and no longer feeling the need to hide her hand.

The gratitude displayed by the patients and hospital staff, including the wonderful farewell dinner and thank you ceremony, was evidence of how much our presence was valued. The UK team also gained much and I have no doubt that we will continue to learn from our Kenyan colleagues; their resourcefulness to name just one and which extended far beyond the clinical environment. I was lucky enough to visit the abundant hospital vegetable gardens and their role in providing delicious and nutritious daily supplies to the staff and patients was truly inspiring. In contrast to the abundance of the gardens however, seeing two post-operative patients sharing a single bed demonstrated the basic lack of resources that our Kenyan colleagues face day to day and which was humbling to say the least.

Although evidently we face differing challenges and constraints, the current UK financial climate highlights that balancing quality and resources is something that faces us all, with more emphasis than ever on ‘more for less’.
In terms of the potential for development on what I feel to be a simple and achievable level, warming of patients was not something that I had predicted might pose a difficulty, but for those of you familiar with the warming devices we use in our UK operating theatres, never before had I so wished I had a roll of plastic sheeting and a hairdryer that I could adapt. Patient warming highlights one area in which education and collaboration with our Kenyan colleagues has the potential to optimise the patient journey and improve outcomes without great cost, financially or otherwise.

Throughout this experience I felt incredibly welcomed and supported; enhanced I believe by the daily evening team meetings held at our accommodation bar prior to our evening meal. An open team get together allowed us to voice any concerns and discuss potential challenges, but more commonly share and reflect positively on the day’s events. It also provided an opportunity to plan the workload ahead, discuss ideas and keep everyone involved and up to date of plans and any changes.

I also feel it worthy of note that our use of a devised framework based upon the WHO checklist for briefing, ‘time out’ and our evident familiarity with this practice of communication in the UK, was testament to our newly formed team of individuals performing like an established and well-oiled machine. Furthermore, the keenness of the local team to continue briefings following our departure was evidence of its benefit and the significant influence it brought, hopefully bringing about a positive and lasting change.

In our limited time off we were lucky enough to experience seeing wild elephants in their natural habitat and regular morning walks were taken to where the hippos hung out. Our return journey to Nairobi airport was also somewhat enhanced with a detour visit to the Aberdare National Park.

There was a real sense of accomplishment while in Kenya, on a professional level and on a personal level and this enrichment is something that I feel I have been able to bring home too. I have challenged my flexibility and problem solving abilities with improvisation necessary at times. I enjoyed the challenge of thinking outside the familiar box where I was able to see the value in an open-minded and an adaptable approach (between occasional oxygen failures, water supply cessation and birds in theatre etc.) but the strong positive influence of using familiar frameworks also became evident. I believe it has broadened my ability to perform well in a sometimes challenging environment and has most definitely encouraged me to question the use of resources. I have been able to build upon existing interpersonal and communication skills, extended my ability to interact with a wide range of individuals and formed lasting relationships in the process.

In summary, the project has provided me with a valued opportunity educationally, clinically, developmentally and socially, as well as globally in terms of experiences both in and out of the operating theatre; something I feel incredibly grateful and privileged to have been part of. I am also grateful to the members of the World Anaesthesia Society for the travel grant I was awarded that helped make this trip possible.

So if given the opportunity to be involved in such a project, both on a professional and personal level, my advice? Grasp it!

For further information, please visit
www.egho.co.uk
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Interviews
Interviews will take place at the Royal College of Anaesthetists in London in May 2016 but provision may be made for teleconferenced interviews for applicants unable to travel for interview.
Having been introduced to the charity Safe Anaesthesia Worldwide by a meeting with their medical director, Dr Roger Eltringham, I decided that I would like to become involved in the valuable work being undertaken by the charity in some of the most difficult and dangerous situations in the world. Dr Eltringham suggested I visit Kathmandu, Nepal, to see for myself how they had coped during the recent large-scale earthquakes. This report is a brief description of my visit during the late summer 2015.

At the dawn of the day, when the early sunrays find their way over the top of the hills encapsulating the Kathmandu Valley, the buzzing capital is already awake. Streets quickly fill to their brim with the widest assortment of life; children in their school uniforms, books securely tucked in their colourful backpacks; food markets lining the pavements; energetic taxi drivers trying to identify potential customers; cars, bicycles and buses filled with people on their way to work, zigzagging past a cow blissfully unaware of her precarious resting place.

At first glance there seems little indication that this is the capital of a country that was hit by two...
disastrous earthquakes only a few months previously. It is only when looking beyond the bustling city life that one spots the large pile of bricks curiously out of place, the surprising open spaces between the tall buildings, or the tent displaying the logo of an international aid organization. The national disaster is only present in the periphery, like a distant memory that is gradually being absorbed into everyday life.

On April 25th 2015, Nepal was hit by an earthquake measuring 7.8 on the Richter scale. This was followed on May 12th by a second earthquake of 7.3 magnitude [1]. The epicentre of the initial earthquake was approximately 80 Km northwest of Kathmandu, followed by an epicentre located northeast of Kathmandu, close to the border between Dolakha and Sindhupalchok districts [1,2]. Although the city of Kathmandu experienced comparatively little destruction there was an inevitable surge in the number of casualties received by the local hospitals.

Following the second earthquake, the charity Safe Anaesthesia Worldwide was contacted via a common link at Fistula Foundation© with an appeal for urgent help from two partnering hospitals, Kathmandu Model Hospital and Kirtipur Hospital, both located in the Kathmandu Valley. Despite the inevitable disruption in the transport and communication systems caused by the earthquake, the charity was able to deliver a portable Glostavent® anaesthetic machine (DPA 01, manufactured by Diamedica Ltd) to Kirtipur Hospital within a few days.

The hospital’s existing electricity generators had been able to compensate for the reduction in the mains electricity supply immediately following the earthquake, enabling surgery to continue. However, the surge in the number of emergency admissions increased the number of in-patients from approximately sixty to over one hundred and thirty, many of whom required emergency surgery. This meant that additional anaesthesia services were required without delay.

The hospital has two main operating rooms, which were unable to accommodate the additional emergency surgery required. However, the arrival of the DPA01 meant that one of the small dressing rooms nearby could be used as an additional operating room (picture 1). As it has no mechanical ventilator, its use was restricted to the shorter procedures, while the more complex operations were undertaken in the main operating rooms where conventional anaesthetic machines were available.

Although no accurate auditing was carried out, it was estimated that the donated Glostavent® was initially used in nearly 20% of operations performed in the immediate aftermath of the earthquake. This percentage gradually decreased over the next four months as the rapidly increased influx of patients subsided.

Initially the increased workload was a direct consequence of the earthquake and included crush injuries and fractures, while subsequent operations reflected the secondary effects of the disaster such as burns and wound debridement. However, despite the huge increase in the workload it is remarkable that the capacity of the hospital was never exceeded during this period.

Interviews with anaesthetists who had used the DPA01 provided very positive views about its ease of use and simplicity. Minor issues encountered during set-up were quickly resolved by the hospital technician. Mild apprehensions were expressed regarding the availability of spare parts should they be required; an additional instruction manual was also requested but in general the staff found it easy to understand and operate. Other members of the staff including nurses, surgeons and Dr Rai, director of Kirtipur Hospital, expressed strong satisfaction with the DPA01.

Many members of staff expressed deep feelings of appreciation towards Safe Anaesthesia Worldwide for supplying this additional anaesthetic machine and to Fistula Foundation© for initiating the donation. Although it is currently not in constant use now that the workload gradually is reverting back to normal, staff were nevertheless very keen that it remained available in the anaesthetic department to ensure the continuity of service should similar emergencies occur in the future. Additionally, as anaesthetic staff was unfamiliar with using draw-over anaesthesia in their routine practice, the DPA01 constitutes an excellent teaching aid. Kirtipur Hospital is furthermore planning to open four more operating rooms in the near future, and plans are in place for the construction of a new hospital in Itahari in Eastern Nepal; consequently the Glostavent® is anticipated to be required on a full-time basis.

In addition to their involvement in surgery performed in Kirtipur Hospital, the services of the anaesthetic department are regularly required in outreach clinics in rural parts of the country. Some of these are equipped with their own anaesthetic machines while others require the visiting team to bring their own anaesthetic machine with them. For many years a smaller version of a continuous flow machine has been used for this purpose (picture 2). Having now become familiar with the DPA01 the members of the anaesthetic department have requested that it not only remains available for use in Kirtipur hospital but also is taken to outlying hospitals when surgery is required.

I feel very privileged to have been able to visit the anaesthesia department in a busy hospital in a developing country and discover how they responded to a disaster of this magnitude. In the event, it seems that they were able to cope remarkably well as the epicentres were some distance away and the hospital itself not badly affected.

I was pleased to discover that the DPA01 arrived intact and ready to use without delay, and that
the efforts of Safe Anaesthesia Worldwide and Diamedica Ltd were greatly appreciated by the local staff. The DPA01 strongly impacted on the hospital's ability to respond to and cope with both the emergency response as well as the long-term recovery from the April and May 2015 earthquakes.

Perhaps the greatest long-term benefit of this donation however was that it encouraged interest in draw-over anaesthesia. As standard continuous flow anaesthetic machines have become more sophisticated, complex and expensive it is easy to forget that they are still dependent on uninterrupted supplies of oxygen, electricity and regular servicing by skilled engineers. Isolated hospitals in poor countries are particularly vulnerable, and hopefully these recent events will act as a reminder that this tried and tested form of anaesthesia is not abandoned.

Acknowledgements:
Safe Anaesthesia Worldwide, Diamedica Ltd, Fistula Foundation©

References

Useful Information

Courses in Anaesthesia for the Developing World

Anaesthesia for Developing countries - 5 day course Kampala Uganda (annually)
Contact: Dr Hilary Edgcombe, Nuffield Dept of Anaesthesia, John Radcliffe Hospital
Headley Way, Headington, Oxford OX3 9DU, UK
Tel: (+44) 01865 221590 E-mail: events@ndcn.ox.ac.uk

Developing World Anaesthesia
1 day course in Bristol 30th April 2012
Contact: DWAsouthwest@gmail.com

Organisations

The International Relations Committee (IRC) of the Association of Anaesthetists of Great Britain and Ireland (AAGBI)
The IRC has a major role in co-ordinating and facilitating overseas anaesthetic training programmes, visiting lecturerships for refresher courses and distribution of limited supplies of textbooks and equipment to developing countries. It administers the Overseas Anaesthesia Fund to facilitate donations to assist in this type of work. It runs the Ugandan Anaesthetic fellowship programme and is involved in the global oximetry project, which has informed Lifebox.
www.aagbi.org

World Federation of Societies of Anaesthesiologists (WFSA)
The World Federation of Societies of Anaesthesiologists (WFSA) is a unique organization in that it is a society of societies. By virtue of membership in a national society, an anaesthesiologist is automatically a member of WFSA. The objectives of the WFSA are to make available the highest standards of anesthesia, pain treatment, trauma management and resuscitation to all peoples of the world.
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United Kingdom
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Fax: +44 (0) 207 631 4352
www.anaesthesiologists.org

Lifebox
Lifebox is a not-for-profit organization saving lives by improving the safety and quality of surgical care in low-resource countries by ensuring that every operating room in the world has a simple pulse oximeter.
www.lifebox.org

Primary Trauma Care Foundation
An organisation training doctors and nurses in the management of severely injured patients in the district hospital.
Box 880
Oxford OX1 9PG
United Kingdom
www.primarytraumacare.org
PTC Chairman:
Charles Clayton
ceo@primarytraumacare.org
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www.remedyinc.org
Remedy@Yale.edu
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Fax (203) 785 5241

Society for Education in Anesthesia
International members are invited to join this Society that promotes techniques and excellence in the teaching of anaesthesia.
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Douleurs sans Frontieres (DSF)
A French NGO that aims to create or to encourage any structure involved in the treatment of pain and suffering (cancer pain, AIDS, acute pain, etc.)
Douleurs sans Frontieres
Hôpital Lariboisière
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75475 Paris, Cedex 10, France
E-mail: dsf.france@doulers.org
www.doulers.org

International Anesthesia Research Society (IARS)
A non-political medical society founded in 1922 to advance and support anaesthesia and research and education.
100 Pine Street
Suite 230
San Francisco
CA 94111
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Tel: 415 296 6900
Fax: 415 296 6901
E-mail: info@iars.org
www.iars.org

The International Committee of the Red Cross (ICRC)
The ICRC acts to help all victims of war and internal violence, attempting to ensure implementation of humanitarian rules restricting armed violence.
ICRC Headquarters
19 Ave. de la Paix
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Geneva
Switzerland
Tel: +41 22 734 60 01
Fax: +41 22 733 20 57
www.icrc.org

Medical Training Initiative (UK)
Anaesthetists seeking posts in the UK should contact:
International Programme Administrator
Royal College of Anaesthetists
35 Red Lion Square
London WC1R 4SG
UK
(+44) 020 7092 1552
Email: IP@rcoa.ac.uk
www.rcoa.ac.uk

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www.goingoverseasnetwork.org

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Mercy Flyers is a not-for-profit organisation whose mission is to take specialist medical care to those who are geographically remote and living in poverty in southern African countries.
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