The challenge of managing burn wounds in Uganda

With only 75 specially trained general surgeons for a population of 30 million, it is unsurprising that there are considerable challenges facing clinicians in Uganda. In this article the author describes his experiences working in the A&E department of a busy teaching hospital in Uganda’s capital Kampala. He describes the day-to-day routine of the unit and explores the unique problems facing the country’s health service.

INTRODUCTION
Uganda has a population of approximately 30 million, a gross national income per capita of $880 dollars (compared to the UK’s $33,650) and a life expectancy of 49 years for males and 51 years for females. The incidence of deaths in those under five years of age is 134 per 1,000 and $143 is spent on health per capita, a sum dwarfed by the UK’s $2,784.[1]

During the spring of 2010, the first author (from here on referred to as YZ) had the opportunity to carry out a medical elective in Uganda. He was based at the Mulago National Referral Hospital (a tertiary referral centre for the whole of Uganda), a government-run 1,500 bedded hospital in the capital Kampala.[Fig 1]. Mulago Hospital is the primary teaching hospital for the Health Sciences department in Makere University. It has an average of 120,000 inpatient admissions and sees 480,000 outpatients annually.

YZ spent eight weeks in Mulago Hospital. Although this is a short time to fully appreciate the complexities of how such a centre operates, it was enough to glean an idea of how some of the departments operated. Of the eight weeks, four were spent on the surgical side of the accident and emergency department (A&E).

THE DEPARTMENT
The A&E is split into surgery and medicine. Patients are triaged in the waiting area by a staff nurse, and those who require surgical assistance were sent to the four-bedded casualty room.[Fig 2]. This is staffed by one senior doctor and often only one senior house officer (SHO) junior-grade doctor, two nursing staff, two porters, two or three medical students and two or three elective medical students. The room next door [Fig 3] contains resuscitation medication and a defibrillation machine, but electricity is only available intermittently. Patients often have to lie in the corridor waiting for one of the four beds to become available. Patients were assessed in A&E and are either admitted or referred as an outpatient after investigations, treatment or medication have been prescribed. In this confined space, turnover is quick and patients are often treated and moved within an hour or two.

The most common surgical cases in this region of Africa are caused by injuries, obstetric emergencies and malignancies[2]. Conditions

References
such as rectal prolapse [Fig 4] are also known to present to the emergency department.

BURNS
Burns are commonplace in Uganda. In a study conducted over a one-year period in 2004, 6% of Mulago’s casualty cases were burns related. These cases are often very difficult to manage due to a lack of resources and were the cause of 15% of mortalities at the hospital in that year[3].

On YZ’s first day in the A&E department, a one-year-old girl was brought in by her mother after suffering scalds from boiling water. No formal assessment of the burn area was carried out, but about 40% of her total body surface area (TBSA) was scalded. The skin was blistered and erythematous and the child was in a lot of pain. The majority of damaged skin appeared to be a superficial partial thickness burn with some areas reaching the deeper layers.

The extent of the injury was difficult to assess and no formal assessment of capillary refill, sensation or blanching of the skin was carried out. Also, rather than using any established burn/scald area assessment methods, the staff had simply approximated the scalded area to be 20%. The water appeared to have been dropped from a height (similar to a ‘pull-over’ scald) and, therefore, most of the injury was confined to the head, upper torso and upper limbs. The patient’s airway did not appear to be compromised and immediate pain management was initiated with an intramuscular dose of diclofenac, which was the only pain relief that was available in the unit on that day. The child was placed on one of the four beds in the open area of casualty while sterile equipment was prepared. No general observations appeared to have been carried out, perhaps due to the lack of suitable paediatric equipment.

The initial objective was to remove all dead skin in preparation for topical administration of silver sulfadiazine. This was very difficult as the pain relief was ineffective and the child had to be managed in the busy and cramped casualty room. There was also no attempt at fluid resuscitation, either due to lack of appreciation of the seriousness of the injury, or lack of resources, or both. On a positive note, sterile gloves were easily accessible and equipment was sterilised in a steamer [Fig 2]. Once all the dead skin had been removed, the doctor and elective medical student administered silver sulfadiazine by hand wearing sterile gloves. Finally the area was covered with sterile gauze and the patient was admitted to the burns unit.

The case described above highlights the challenge of providing effective wound care in an under-resourced unit. Although this encounter was brief, it nevertheless reflects a normal working day and highlights many of the problems the department regularly faces. The lack of trained emergency physicians and suitable paediatric equipment, and the

Page points
1. On the author’s first day in the A&E department, a one-year-old girl was brought in by her mother after suffering scalds from boiling water.
2. The initial objective was to remove all dead skin in preparation for topical administration of silver sulfadiazine.
3. The patient was later referred to a burns surgery unit where fluid management could be carried out.
4. The case highlights the challenge of providing effective wound care in an under-resourced unit.

Reference
absence of specialist burns care and expertise, including burn surgeons and anaesthetics, highlights the gulf between this setting and those in Western hospitals. The differences are also reflected in the higher morbidity rate of burns in resource-poor settings.

THE CHALLENGES FACING UGandan CLINICIANS
The general lack of support for surgery in Africa has been well documented\[2,4–7\] and although Mulago’s A&E is a busy department, it is poorly funded. Surgical conditions make up 11% of the global disease burden\[8,9\], yet in Africa spending is minor when compared with the amount spent on infectious disease treatment\[8,10\]. However, many basic surgical procedures can arguably be just as cost-effective as the treatment for infectious diseases\[6,7,9\]. The Disease Control Priorities Project publishes data demonstrating that the average cost per disability adjusted life years (DALY) averted for a set of basic surgical procedures is less than the cost of HIV/AIDS treatment\[9\].

Surgical departments are often understaffed and there are only 75 specialist surgeons in Uganda to cater for a population of 30 million\[10\]. In any case, specialists are mainly based in the larger cities, leaving the district hospitals in severe need of essential medical expertise.

Lack of staffing is compounded by poor funding and training opportunities as well as the loss of doctors who leave to work overseas. Between 1998 and 2002, Ghana lost $35 million of training investment in health when doctors left to work in the UK (allowing the UK to save $65 million in its own training costs)\[10\]. To address the need for skilled workers, a number of African countries have trained non-doctors in basic surgical procedures in order to increase the numbers of competent staff through faster and cheaper channels. This has proven to be highly successful\[2,4\] and the majority of procedures are carried out by general doctors and a specially trained workforce\[10\].

The human resources and surgical issues facing many African countries are being addressed by international committees such as the Bellagio Essential Surgery Group, which is gathering evidence and lobbying for improved surgical care in Sub-Saharan countries\[6,9\]. It has highlighted that burn surgery, in particular, needs to be improved. Mulago has links with a number of western universities, including the University of California, San Francisco (UCSF) and Yale University in the US, allowing for intellectual exchange and the promotion of awareness of the difficulties that Uganda faces.

BURN MANAGEMENT
A brief overview of the general principles of managing burns is outlined below, including methods to estimate TBSA burned, evaluating burn depth and some essential early management aspects.

The ‘rule of nines’ is a useful tool for estimating the TBSA of a burn — clinicians should allow 18% each for the chest, back and each leg, 9% each for the head and each arm, and 1% for the perineum. The patient’s palms and fingers, which represent just under 1% of the TBSA, are also a useful method for estimating the size of the burn area. The types and features of different burn depths are highlighted in Table 1.

Management of minor burns
A burn should be cleaned initially with soap and water (or a diluted water-based disinfectant) to remove loose skin, including open blisters. Any blisters should be de-roofed apart from those that are isolated and under 1cm² in area — these can be left alone. Simple non-adhesive dressing such as a soft silicone padded by gauze is effective in most superficial and superficial dermal burns. However, biological dressings such as Biobrane™ (Smith & Nephew) and non-animal derived synthetic polymers such as Supratel™ (PMI) may be useful in certain types of burns, although their use is limited to specialised burns units.

Silver sulfadiazine can be used for deep dermal burns and dressings should be examined after 48 hours for reassessment of depth. Further dressing changes for superficial partial thickness burns may

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be carried out after 3–5 days provided there are no signs or symptoms to suggest infection. However, daily wound inspection and dressing change is indicated if there is evidence of infection. Deep dermal burns need daily dressing until the eschar has lifted and re-epithelialisation is underway, then the frequency of dressing changes can be reduced.

Management of major burns
All major burns should initially be managed initially according to the following trauma resuscitation guidelines:

A: Airway maintenance with cervical spine control
B: Breathing and ventilation
C: Circulation and haemorrhage control
D: Disability – neurological status
E: Exposure and environmental control
F: Fluid resuscitation proportional to burn size.

Fluid resuscitation proportional to burn size is essential for burns that are over 10% in children and 15% in adults. The volume required is calculated on body weight and the TBSA that has been burnt. Thus, the frequently used Parkland formula\(^{13}\) defines the amount of fluid that should be given as 3–4ml/kg/%/TBSA burn in the first 24 hours, with half given in the first eight hours. The resuscitation period starts from the time of injury, and thus any delays in presentation or transfer to the hospital/specialist unit should be taken into account and fluid requirement calculated appropriately.

Other key measures include:
- Remove all clothing as soon as possible (unless adherent to underlying skin, eg nylon)
- Cool the burn with cool/tepid running water for at least 20 minutes. Do not use very cold or icy water as this causes vasoconstriction, worsening tissue ischaemia and deepening the wound
- Cover the burn, preferably with polyvinyl chloride film or a sterile cotton sheet
- Do not use topical creams or agents such as silver sulphadiazine as this makes subsequent assessment of burn depth difficult.

CONCLUSION
Providing effective wound care in such resource-constrained settings is challenging. In the developed world, essential equipment such as cannulae for intravenous access and fluid-giving sets are taken for granted, whilst these are considered to be a privilege in many hospitals in Uganda. Practising medicine in this environment creates a greater awareness and understanding of the ongoing problems that countries such as Uganda continue to face in providing effective healthcare.

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Page points

1. The victim of a burn should be removed from the source but without danger to rescuers
2. Any clothing, except that adhering to the skin, should be removed immediately.
3. The burn should be cooled with tepid water
4. Do not use cold or icy water as this will cause vasoconstriction, worsening tissue ischaemia and deepening the wound

References