

## Out with the *Old* – In with the *New*

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Fig 1. Africa Mercy in Monrovia docks

The **AFRICA MERCY** (fig 1), the world's largest NGO hospital ship, equipped with six operating theatres, 80 ward beds and accommodation for up to 450 self funding volunteers started at last to fulfil her destiny in West Africa in June 2007.

After eight challenging years in a Tyneside dockyard and generous support from people all over the world the £25M conversion from Danish train ferry *Dronning Ingrid* to her new role of providing modern surgical care for the poor in West Africa was complete.

On March the 14th my wife and I travelled out to Monrovia with Dr Anuraag, an anaesthetist from Nottingham, and Richard, an engineer from *Diamedica* (co-designer with Dr Roger Eltringham of the *Glostavent* and one of a team in 1994 to have dived the *Lusitania* at a depth of 150m) to work on board this new ship for the first time.

I was filled not only with excitement but also sadness at the recent demise, in an Indian scrap yard, of the *Anastasis* which over the years had become the 'Great White Ship of Hope' to so many in West Africa. Mercy Ships has become a significant part of my life since I first visited the *Anastasis* in London in September 1990, flying out to Accra a few months later for the first of 19 visits over 16 years to this amazing ship. I have been privileged to serve on board as an anaesthetist in ten different African countries, accounts of my experiences can be found on my website:

[www.africansmiles.co.uk](http://www.africansmiles.co.uk)

### The OR medical team

There were six anaesthesia providers, two CRNAs from the USA and four UK anaesthetists, both Nigel from Sheffield on board for six months and expert at fibre-optic intubation and Anuraag from Nottingham were post CCST and Max was an ST2 from Newcastle.

The maxillofacial operations performed included cleft-lip and palate repair, excision of large jaw tumours and correction of terrible facial scarring the legacy of noma.



Fig 2. VVF Surgery on the ship

Vesivo-vaginal fistula (VVF) repairs were done by USA urologist Steve Arrowsmith (fig 2) and a gynaecologist colleague who was learning his techniques. There was orthopaedic surgery, predominantly club foot correction (caudal bupivacaine 0.25% +2ug/kg clonidine provided good intra and post-op analgesia) and also two eye surgeons, Dr Glenn Strauss (Vice President of Healthcare services for Mercy Ships) and my friend Dr James from Windsor doing a remarkable amount of work – up to 40 cases daily using a sutureless ECCE technique developed by the former for cataract extraction.

The anaesthetic equipment included machines, monitoring (+ inhalational agent) and a supply of modern drugs and disposables. The new dedicated room for anaesthetic equipment was well organised and labelled rather than the more random situation which existed on the *Anastasis*. My only reservations with the well planned theatre suite were firstly the absence of portholes to provide natural light during long

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working hours and secondly no staff coffee room, the nearest such facility was up two decks to the canteen (fig 3) or 'Starbucks'.



Fig 3. Ship's canteen

The up-to-date equipment and supply of disposables on board stood in dramatic contrast to what was available in local hospitals which is why I decided to try and influence the provision of anaesthesia in Liberia initially by organising the first national anaesthetic conference in November 2007 [1] and secondly by arranging for a *Glostavent* (fig 4) to be put on the ship in Tenerife with the aim of training local anaesthesia providers in its use.



Fig 4. *Glostavent* on *Africa Mercy*

### The Glostavent

([www.glostavent.com](http://www.glostavent.com))

Last December I spent a useful day with inventor Dr Roger Eltringham in theatre at Gloucester Royal Infirmary familiarising myself with the machine. Four are now in Liberia and in my opinion it is currently the most ideal anaesthetic machine on the market for use by developing world anaesthesia providers. It is manufactured in the UK by *Diamedica* and is reliable, robust and claims to require almost no servicing. It has a simple vaporizer which can use either isoflurane or halothane and

a Manley type ventilator with easily interchangeable paediatric and adult bellows. Most important of all is a built-in oxygen concentrator which generates up to eight litres a minute of 95% oxygen, so long as there is a reliable power supply. Even if that fails it can still run off a compressed oxygen cylinder when available. It is simple to train anaesthetic providers to use and can be utilised for long term ventilation.

At the recent World Congress in Cape Town a case from a mission hospital in Uganda was presented where a patient with tetanus was ventilated on a *Glostavent* for 38 days and survived.

On the 17th March assisted by design engineer Richard, I successfully anaesthetised two cases on the *Africa Mercy* using the *Glostavent*. Later that day we went to the JFK Hospital to set-up their recently delivered machine only to find the box in a storage facility only contained a few computer parts.

A serious argument between the local staff then ensued; not wishing to become embroiled we retired to the hospital canteen. Remarkably 90 min later, contrary to my predictions, the correct box materialised and Richard was able to both install the machine and give a training session to the operating theatre staff. Later that day he contacted the SDA Cooper Hospital for which the Christian Blind Mission in Australia had not only bought a machine but also funded his travel to Monrovia. Bizarrely the doctor he spoke to initially said he did not want Richard to come and sort out their machine. But as the character played by Leo di Caprio says in the excellent film '*Blood Diamond*' – 'TIA' – which is an acronym for 'This is Africa!'

On the 20th March the first anaesthetic in a Liberian hospital using a *Glostavent* was performed on a woman for myomectomy at the JFK (fig 5).



A 'normal' anaesthetic was performed with ketamine induction, intubation using suxamethonium, and then the patient was ventilated using O<sub>2</sub>/air/halothane. All went well but the second patient on the list was a different matter:

This was a six-day-old 2.3kg baby with an imperforate anus requiring a colostomy. I discussed the anaesthetic with the local team and recommended that some atropine should be available. A dose of 1mg in 1ml was drawn up! A halothane/O<sub>2</sub> induction was performed but the nurse anaesthetist was unable to intubate the baby and, despite my usual rule of not getting involved clinically in African hospitals, with the baby becoming increasingly blue and bradycardic I took over. I then stood back and allowed the anaesthetic nurse to ventilate the baby manually using a t-piece circuit connected to the *Glostavent* after demonstrating what was an appropriate rate and tidal volume and setting the weight on the machine at a 'blow off' value of 15cm H<sub>2</sub>O. Towards the end of surgery I suggested some lignocaine for the wound so 10mls of 1% was drawn up, which after a quick calculation I changed to 1ml diluted in about 6ml of water! Another hour was needed for the baby to respond adequately to be extubated. The immediate sound of crying was music to my ears (see video clip on [www.africansmiles.co.uk](http://www.africansmiles.co.uk)).

Richard and I then retired to the hospital canteen for a badly needed beer with him making comments like "I didn't see you do anything there did I Keith, you did tell me you never

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get involved when you visit African hospitals?" An hour later we came back to find the baby now in the ICU wrapped in a blanket with no monitoring, no oxygen and the only nurse on the other side of the room talking to a friend.

### Easter weekend

On the Saturday we went shopping in a craft market in Monrovia. Remarkably a local man came up to me and said "Did you drop this?" and handed back a \$5 note which was my change from a previous purchase. This was remarkable considering that the average daily wage is only \$2.50 but I did feel obliged to go and buy something from his stall.

That afternoon we visited the Agnes and Alfred Memorial Orphanage where over the past two years I had been involved with helping to build a computer centre. Sadly two weeks before 16 computers had been stolen after the security lock had been forced during the night which left ten still functioning (fig 6).



Fig 6. Computer centre at orphanage

I was shown an article from a local Monrovia newspaper (*The Informer* – March 18) about the crime which said the computers had been donated by philanthropist 'Dr Thomas Kith'.

Projects funded by others include both the building of a new dormitory for 35 girls and the rebuilding of school classrooms. They have also recently obtained a 75 acre farm some miles away which will be used for growing vegetables and providing work for some of the older boys who have to leave the orphanage when aged 18.



Fig 7. Toilet at church

Easter Sunday began with an emotional service on the quay, taken by the ship's Swiss lady chaplain. We then went to the Jamaica Road Evangelical Church (JREC) to both attend the vibrant African style service and review how the nearby toilet block (fig 7), that I and others had been helping to finance, was progressing. I was referred to in the service leaflet as 'the brain behind the toilet.'

In the evening I went to a party hosted by Jim, a Clinton Foundation sponsored fellow at JFK and Denise his colleague at Redemption hospital. En route I went to see little baby Mary I had anaesthetised three days before, and was pleased to find that she and her mother Esther were both well (fig 8).



Fig 8. Baby Mary with mother

However 24 hours later Mary was taken to another hospital (I am not sure why) where a nurse removed the sutures resulting in a burst abdomen. She was then transferred back to JFK and is now apparently doing well after surviving another anaesthetic.

In the next door bed was nine-year-old Blessing awaiting a date for a consultation with Dr Gary Parker on the ship. Six weeks before she had injured her left leg in a fall (fig 9). This incident had triggered an attack of noma resulting in severe



Fig 9. Blessing 8/02/08



Fig 10. Blessing 23/03/08

deformity with limited mouth opening (fig 10). Creating a normal looking face will provide a surgical challenge.

At the party I met a lady from the American Embassy who had organised a lunch in honour of the US President's recent visit to Liberia. The Mercy Ship's Founder President Don Stephens had attended the function and was the only guest to have an unscheduled meeting with George W. Bush, invited to do so by Liberian President, Ellen Johnson Serleaf. Apparently he was fortunate that the security guards had not regarded him as more of a threat and taken dramatic action.

I also met a young emergency room doctor from the USA who was being sponsored by her college to work at JFK for one month. She would then be succeeded by several others each overlapping with their predecessor for one week.

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I wondered whether perhaps this sort of system might work for volunteer anaesthetists from the UK? To have Western trained anaesthetists supervising local anaesthetic providers with their available equipment and drugs might be a way of trying to improve provision of anaesthesia in Liberia. As I write Dr Judith Hall from Cardiff is taking a team to Phebe hospital to do exactly this for ten days in May.

### Phebe Hospital

Eight of us visited this institution which claims to be the only Anaesthesia Training School in the country. The 'easy' 2½ hr trip took over four hours each way. A poignant memorial stood in the grounds dedicated to several hundred patients and staff who, during the 'dark days' of 1994, had been massacred by rebels forces.



Fig 11. Teaching at Phebe

We had an interesting visit and were impressed by the teaching which was evident both in midwifery (fig 11) and in anaesthesia which currently supports seven trainees.

The two operating rooms were equipped with American donated Omeda Excel machines which did seem to work but, as in most hospitals in Liberia, they were running out of disposables like soda lime, spinal needles and anaesthetic drugs. The custom in Liberia, as elsewhere in Africa, seems to be no forward planning but just to wait until you have almost run out.

Recovery facilities did not exist and patients were usually sent straight back to the ward or sometimes to the 'ICU' where there were no ventilators, no monitors, no suction and

no oxygen although the latter was usually situated near the nursing station. I think '*I see you*' would be a more appropriate terminology.

We were quite impressed by the Maternity unit which had appropriate protocols on the wall including 'induction and augmentation of labour,' 'severe pre-eclampsia and eclampsia' and 'active management of the 3<sup>rd</sup> stage of labour.' During the return journey along a very potholed road we were caught in a torrential downpour, our driver had some near misses. It was only when we returned to the Ship that I discovered that Emmanuel had in fact lost his left eye after a shrapnel wound during the recent conflict.

### Redemption Hospital



Fig 12. Dental surgery at Redemption

The visit to Redemption Hospital where the ship's dental teams (fig 12) were working was interesting. In the theatre there was no anaesthetic machine (fig 13), just an Ambu bag so I decided to transfer the *Glostavent* there from the *Africa Mercy*.



Fig 12. Theatre at Redemption

The anaesthetic providers used reusable 22g Quinke point spinal needles two or three times until blunt with no local anaesthetic for the skin. The G A technique for Caesarean section consisted of spontaneous breathing on a face mask after

atropine, ketamine with insertion of a naso-gastric tube indicated if a full stomach was suspected. Intubation using suxamethonium was only performed if the patient had had a previous section. 5 mg of diazepam was administered after delivery. I visited the labour and post natal wards where impressively each bed had its own mosquito net. I met one woman who had recently delivered triplets, all over 2Kg. She had delivered one normally at home and the other two by Caesarean section at the hospital. The paediatric ward seemed relatively empty but apparently a couple of days before there had been two children in each bed for a visit by the President of Liberia.

### Around the *Africa Mercy*

Moored on the other side of the quay was a vessel called the '*Blue Atlantic*' (fig 14) which had been arrested at sea by a French Naval gunboat and escorted into Monrovia harbour where two and a half tonnes of cocaine valued at \$0.5 billion was found on board.



Fig 14. The Blue Atlantic

The eight Ghanaian crewmen had been arrested and the illicit cargo allegedly all burnt. Local rumour had it that this was hard to prove!

A disused crane (fig 15) was being cut to pieces with hacksaws by local men who apparently were paid \$20/10kg for scrap metal but had no thought for their own safety.



Fig 15. Crane being cut up for scrap

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We visited several local restaurants all with their own character including La Pointe, Mambo point, La Palme, the suchi bar at the Royal Hotel and the Marlin where part of the railings was made out of used RPG (rocket propelled grenade) tubes (fig 16).



**Fig 16. Railings with RPG at the Marlin Restaurant**

One evening our taxi was a genuine 'hybrid' car – the front half was a Toyota and the rear a Datsun!

### In summary

I had spent another fascinating two weeks in Liberia both working on board the new Mercy Ship and also visiting various local hospitals.

The country with a population of 3.7 million only has 35 anaesthesia providers all of whom are nurses. In many respects they do a remarkable job in spite of challenging working conditions and pay of less than \$20/ week. They could be helped by donation of reliable new equipment like the *Glostavent* and assistance given to organise a regular supply of essential disposables like spinal needles, local anaesthesia, ketamine and halothane.

Potential donors should be encouraged to supply appropriate medical equipment unlike the two renal dialysis machines recently supplied to the JKF hospital by a USA rotary club.

The anaesthesia providers also need regular training. I am planning a follow-up conference in November 2008 and would like suggest to the Association of Anaesthetists and WFSA that perhaps sponsorship could be found for interested anaesthetists to come and spend a few weeks alongside these dedicated

nurses training them how to use their available equipment and drugs more effectively and safely.

Anaesthetists are also still needed to work on board the Africa Mercy until November this year and then from February 2009 in Cotonou, Benin. An application form can be obtained from [www.mercyships.org](http://www.mercyships.org) or by phoning 01438 727800 .

### Reference

1. Thomson KD. First Liberian Anaesthetic Conference. *Today's Anaesthetist* 2007; 22 (4): 96-98.