MKAIC

Muhimbili-Karolinska Anaesthesia and Intensive Care Collaboration

Project Report: Teaching course in Obstetric Anaesthesia Muhimbili National Hospital, Dar es Salaam, Tanzania 3-7 May 2010

Background

Maternal and newborn (neonatal) mortality in Tanzania are unacceptably high. At close to 1%, the maternal mortality ratio is 300 times higher than in Sweden.[1] 1 in every 30 babies dies in association with being born.[2] A major determinant of maternal and newborn mortality is the care that a mother receives in hospital if a complication arises.[3] This emergency care often involves caesarean section or other surgery that involves anaesthesia. Poor quality anaesthesia is a common occurrence in developing countries.[4] It can result in complications being missed, acute treatments being delayed or omitted, suboptimal choice and practice of anaesthesia and, all too frequently, the death of the mother or child. The quality of obstetric anaesthesia provision is a crucial determinant for the outcome of emergency care and improving obstetric anaesthesia could result in significant reductions in maternal and neonatal mortality.

Muhimbili National Hospital (hereafter referred to as Muhimbili) is the largest hospital in Tanzania and functions as the highest level referral hospital in the country. The hospital has 1500 beds, 1100 out-patients are seen each day and 55000 patients are admitted annually. Approximately 10,000 babies are delivered each year at Muhimbili, many of which are complex cases referred from other facilities. 50% are delivered by caesarean section in the two obstetric theatres, necessitating anaesthetic input. Anaesthesia is also required for obstetric haemorrhage, placental removals and hysterectomies.

Resources for obstetric anaesthesia are severely limited. The department of Anaesthesia and Intensive Care at Muhimbili has 6 specialist doctors, to provide anaesthesia in all the hospital's 14 operating theatres plus supervising the Intensive Care Units (there are currently 9 ICU beds and 21 more will be opened soon). There are no specialists in Obstetric Anaesthesia. The large anaesthetic workload means that the few specialists are not able to provide round-the-clock supervision of the obstetric theatres. Anaesthesia for obstetric surgery is usually carried out by nurses or partially trained anaesthetic officers. The anaesthetic knowledge of these staff was gained during their initial vocational training, supplemented by "on-the-job" diffusion from colleagues, and informal teaching from the specialists. None of the staff have had formal in-service training in obstetric anaesthesia. The facilities in the obstetric theatres are basic, with only one ventilator, manual blood pressure monitoring and no pulse oximeters or syringe pumps. The consequences of poor anaesthetic resources are high maternal and neonatal mortalities. In Muhimbili in 2009 forty-two mothers (one per two hundred deliveries) and 10% of newborn babies died.

Karolinska University Hospital (hereafter referred to as Karolinska) is a national referral hospital in Stockholm, Sweden. The hospital has 1600 beds, 4000 out-patients are seen each day and 100,000 patients are admitted annually. The department of Anaesthesia and Intensive Care employs 105 Anaesthesiologists and almost 100 anaesthetic nurses. There are three specialists in Obstetric Anaesthesia, at least one of whom is on duty everyday to provide anaesthesia for the 1000 caesareans and other obstetric and gynaecological operations carried out annually. Many of the staff have formal training in obstetric anaesthesia, the facilities are modern and advanced and the standard of the care given can be regarded as good as anywhere in the world. Less than one mother dies each year in Karolinska and neonatal mortality is around 0.1%.

The Muhimbili-Karolinska Anaesthesia and Intensive Care Collaboration (MKAIC) was started in 2009. The initiative came from the doctors at Muhimbili who identified Anaesthesia as a priority area for improvement and an international partnership as the way to achieve this. A formal agreement has been signed with the aims of improving anaesthesia and intensive care provision in the two hospitals, and increasing international and cross-cultural understanding. This report covers the first project within the collaboration: a teaching course in Obstetric Anaesthesia at Muhimbili Hospital in May 2010.

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Aim of the teaching course

To improve the Obstetric Anaesthesia knowledge and skills of staff at Muhimbili thereby improving care for patients and to increase understanding and cooperation between Karolinska and Muhimbili.

Objectives of the course

By the end of the project:

1. Knowledge and skills about obstetric anaesthesia among doctors and nurses at Muhimbili will have improved
2. Five staff from Karolinska will have spent a week at Muhimbili
3. There will be a greater mutual understanding between the staff at Muhimbili and Karolinska, and increased knowledge about the best ways to take MKAIC forwards
4. A plan for the next projects within MKAIC will have been discussed and decided upon
5. Obstetric anaesthesia at Muhimbili will have improved

Planning

During 2009 the course was planned. The teachers from Karolinska were chosen to be Prof Lars Irestedt, Dr Tim Baker, Dr Henrik Jörnvall, Dr Ulf Lindsten and Nurse Anaesthetist Gunilla Lööf. The local coordinator at Muhimbili was to be Dr Mpoki and the teacher from Muhimbili was Dr Moses Mulungu. 50,000 SEK were generously donated from the Carpe Vitam Foundation, additional funds were raised from local events and anaesthetic textbooks were donated by Organon/Schering-Plough. Dr Mpoki chose the course participants and organised all practicalities.

Dr Ulisubisya Mpoki

Dr Mpoki is the Head of the Department of Anaesthesia & Intensive Care at Muhimbili. He is a specialist Anaesthesiologist and has worked at Muhimbili for 15 years, of which the past 6 as departmental head. Following his medical training and specialist Masters in Tanzania he has trained in Australia and India. As departmental head, he is in a unique position to make the collaboration successful, and has expressed great enthusiasm for the project.

Dr Tim Baker

Dr Baker is a doctor in the Department of Anaesthesia & Intensive Care at Karolinska. He has worked in Anaesthesia since 2001, and will receive specialist certification in September 2010. He has had a longstanding interest in global and African health, and has been involved in many projects throughout the world. In 2005 & 2006 he worked for 2 years in a rural district hospital in Tanzania, improving the Intensive Care Unit, teaching and taking care of the paediatric inpatients. He has published reviews on critical care in low-income countries, and carried out research in the field in Tanzania. He speaks Swahili and is passionate about working again in Tanzania and developing this collaboration.

Dr Lars Irestedt

Dr Irestedt is a Consultant and Associate Professor in Obstetric Anaesthesia at Karolinska Hospital. He has worked in Anaesthesia since 1970 and has been both Head of the Department of Anaesthesia & Intensive Care and Head of Obstetric Anaesthesia. He has carried out extensive research in anaesthesia and is widely seen as one of Europe's foremost obstetric anaesthetists. He was the first doctor at Karolinska to initiate MKAIC and is extremely interested to develop long-term links between Karolinska and Muhimbili.

Schedule

The first day (Monday 3rd May) was for the introduction of the staff of Karolinska and Muhimbili to each other and orientation to the hospital.

Days 2-4 (Tues-Thurs) were the teaching course. The teaching consisted of formal lectures interspersed with interactive sessions. These included role play scenarios, group discussions, questions and recap sessions. A test was conducted at the start and end of the course, and feedback from the participants was sought both

written/anonymous and open. The participants were each given a book – the "Oxford Handbook of Anaesthesia", generously donated by Organon/Schering-Plough.

Time was also taken during days 2-4 to re-visit the obstetric theatres and neonatal wards. Prof Irestedt was asked to demonstrate a spinal anaesthesia and, together with Dr Mulungu conducted the anaesthesia for an elective caesarean.

A detailed course schedule is in Appendix A.

Impressions of the hospital

Muhimbili is a large, sprawling hospital, with many separate buildings for the various wards and departments. The buildings are of various ages and designs and the standard of facilities, resources and care is hugely varied. A new Emergency Medicine Department, built with donated funds, provides a standard of care comparable with that found at Karolinska. Facilities for obstetrics, neonates and obstetric theatres are however far poorer. Many patients are crowded in small rooms, the staffing levels are low, and equipment such as oxygen and suction are scarce.

Prof Irestedt's Neonatal Resuscitation

Following a successful spinal anaesthetic by Prof Irestedt, a baby boy was delivered by caesarean section. He was carried, as is routine, to the resuscitation table by the midwife (who had been unable to attend our course). The baby wasn't breathing, and yet the midwife didn't attempt any resuscitation. The baby was blue, and looking very sick. Fortunately Prof Irestedt and Dr Tim Baker saw what was happening and put into practice the simple ABC rules that they had been teaching. Using a bag-and-mask, equipment that had been brought from Karolinska that same day, they were able to ventilate the baby, inflating the lungs and re-oxygenating the blood. After 10 minutes the baby started breathing and began crying soon after. MKAIC's first life saved!

Course Participants

40 participants took part in the course:

1	Specialist Anaesthesiologist
4	Anaesthesiologist trainees
17	Anaesthetic Nurses & Officers
1	Specialist Obstetrician
10	Obstetrician trainees
7	Nurses

Knowledge Test

Each participant received a test at the beginning of the course, and again at the end. (Appendix B)
In the pre-course test the participants scored an average of 11.8 questions answered correctly out of 18 (65.6%). After the course the average score was 15.4 (85.4%) giving an average improvement of 20.5%.

Course Feedback

A feedback form was distributed at the end of the course for the participants to fill in. The feedback was overwhelmingly positive. Over 80% of the participants felt the course was "very useful" for their work.

Some comments:
"Prof Lars is wonderful"
"The lecturers are well coordinated and give room for discussion"
"The course was interactive, participatory, the scenarios were very good"
"The topics were relevant for my day-to-day work"
"The teachers were very supportive and used good methods of teaching"
"The course was very good for me as it is the first I have got and is very useful – keep it up!"
"It will help me in my setting where I am working because I will practice what I have learnt"

"The lecturers they were so charming"
"Very interactive facilitators, very adult-learning friendly"
"Excellent teaching, excellent scenarios, excellent discussions"
"The lectures were very good for me"
"Facilitators were extremely knowledgeable"
"The whole course was perfect and understandable"

Budget

The total cost of the course was 61,175 Swedish Kronor.

	Return Flights Stockholm - DAR	**39000**
	Visas	**2500**
	Transfers in Stockholm	**1000**
	Transfers in Dar	**700**
	Insurance	**0**
	Medical expenses	**700**
	Accommodation Dar	**14700**
	Evening meals Dar	**2275**
	Stationary	**300**
	TOTAL SEK	**61175**
	(dollars)	**(8739)**

Future plans

Following discussions with Dr Mpoki and Dr Mulungu, it was decided that the next course should be in "Paediatric Anaesthesia and Care of the Critically Ill Child". This follows on naturally from Obstetric Anaesthesia, and it is clear that care for women and children are priority areas for improvement at Muhimbili. The course is planned for November 2010. A further course in Critical Care is planned in April 2011. The initiation of exchanges is seen as a priority. A trainee anaesthesiologist from Karolinska will work at Muhimbili for three months from November 2010 and it is hoped that two anaesthesiologists from Muhimbili will visit Karolinska in 2010/2011.

Conclusions

The initial project objectives 1, 2, 3 and 4 have all been successfully met. Objective 5 is a longer term goal and is yet to be evaluated – it will be assessed at the subsequent MKAIC visits to Muhimbili.

Overall the course has been an overwhelming success, far above the initial expectations. The reception at Muhimbili was extremely positive, the staff from Karolinska found it rewarding and interesting, the participants gave the course very positive feedback and the test showed a dramatic improvement in knowledge levels. Most of all it was clear that there is a huge need for an initiative in Anaesthesia and Intensive Care. MKAIC has both a well defined role and the capacity to fulfil that role. Improvements are important and achievable, and if MKAIC can continue to achieve its objectives there is considerable potential to save a significant number of lives.

References

1. UNDP. Human Development Report. 2007-8.
2. WHO. World Health Statistics. Geneva: World Health Organisation, 2008.
3. AMDDColumbiaUniversity. Quality Improvement for Emergency Obstetric Care - Leadership Manual. 2003.
4. Hodges SC, Mijumbi C, Okello M, McCormick BA, Walker IA, Wilson IH. Anaesthesia services in developing countries: defining the problems. *Anaesthesia* 2007;62(1):4-11.

Appendix A Course schedule

Tues:	9.00:	Arrival of participants and introduction
	9.30:	Pre-course test
	10.00:	Introduction to obstetric anaesthesia, physiological changes during pregnancy
	11.00:	Coffee
	11.30:	Obstetric Emergencies/Bleeding
	12.30:	Scenarios
	13.15:	Lunch
	14:00:	Spinal anaesthesia
	14.45:	Scenarios (Emergencies)
	15.30:	End
Wed:	8.00:	Recap
	8.30:	Neonatal resuscitation
	9.30:	Scenarios (Neonatal)
	10.30:	Coffee
	11.00:	Drugs & pain relief
	12.30:	Lunch
	13.15:	Spinal Anaesthesia
	14.00:	Seminars
	15.00:	End
Thurs:	8.00:	Recap
	8.30:	Eclampsia, pre-eclampsia
	9.30:	Book session & questions
	10.30:	Coffee
	11.00:	Pre-op care
	11.45	Post-op care
	12.30:	Post-course test
	13.00:	Lunch
	13.45:	Feedback
	14.15:	Test discussion & certificates
	14.45:	Closing address
	15.00:	End

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Appendix B Pre & Post course Test

1. If a full-term pregnant woman stops breathing how many minutes before she will become hypoxic?
- 1 minute
- 3 minutes
- 6 minutes

2. The physiological changes at full term pregnancy include:
- Decreased FRC and increased blood volume
- Bradycardia and increased FRC
- Decreased blood volume and raised haemoglobin

3. An anaesthetised woman is lying flat on the operating table ready to undergo a caesarean. She suddenly develops severe hypotension and bradycardia. The most likely cause is:
- Amniotic fluid embolism
- Acute heart failure
- Vena Cava Syndrome

4. The standard intubating dose of Thiopentone is:
- 1-3 mg/kg
- 8-12 mg/kg
- 4-7 mg/kg

5. Failed intubation tends to be 10 time more common at term than in the non-pregnant patient. The safest airway when performing a caesarean under GA is:
- ketamine anaesthesia without intubation
- intubation
- mask ventilation

6. The following are essential in a rapid sequence induction:
- Pre-oxygenation and availability of suction
- mask ventilation and atropine
- IV lidocaine and cricoid pressure

7. During a spontaneous vaginal delivery the patient is bleeding profusely. Immediate first action should be:
- intubation
- secure venous access
- IV ephedrine

8. Immediate treatment for an eclamptic fit is:
- antihypertensive
- Magnesium Sulphate
- IV fluid

9. What would be considered normal blood loss during a spontaneous vaginal delivery?
- 400ml
- 1000ml
- 1400ml

10. What is the leading cause of maternal mortality in the world?
- eclampsia
- infection
- haemorrhage

11. The correct dose of adrenaline for neonatal resuscitation is 10mcg/kg. If your adrenaline is 0.1mg/ml how many millilitres should you give to a 3kg baby?
- 0.3ml
- 3ml
- 0.1ml

12. Which of the following is a contraindication for spinal anaesthesia
- hypovolaemia
- anaemia
- pregnancy induced hypertension

13. Before conducting a spinal anaesthesia the following drug must be immediately available:
- penicillin
- ephedrine
- atropine

14. What is the optimal height of blockade of a spinal anaesthetic for a caesarean?
- T4-T5
- T9-T10
- C8-T1

15. What is the first course of action for a newborn baby who is not breathing?
- chest compressions
- tactile stimulation
- IV adrenaline

16. What is the correct ratio of chest compressions to breaths in neonatal resuscitation?
- 15:2
- 3:1
- 6:1

17. What is the best local anaesthetic for spinal anaesthesia for caesarean?
- bupivicaine
- lidocaine
- prilocaine

18. Which drug does not affect uterus contractions?
- oxytocin
- ibuprofen
- nitrous oxide

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Appendix C Photos from the Course

Muhimbili

Participants

Lecture

Scenario

Donated books

Learning to use the books

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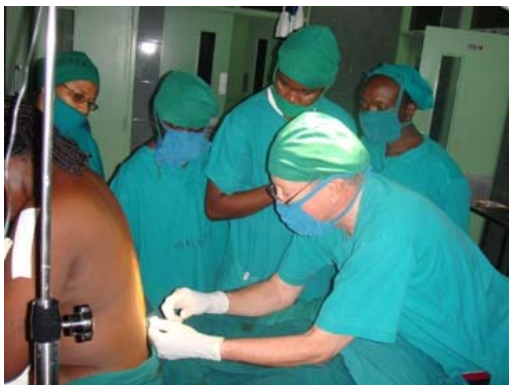
Meeting Muhimbili's boss, Prof Lema

Question session

Certificates

Group session



Spinal anaesthesia

Obstetric theatre