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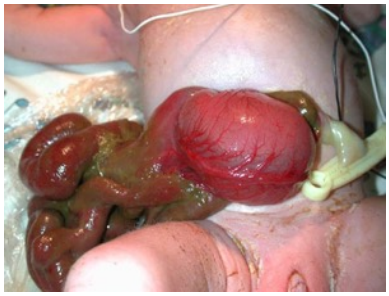
# Trip Report

## Gastroschisis International

Gastroschisis (GS) is a type of congenital abdominal wall defect. It occurs when an infants abdominal wall does not form completely and the intestines develop outside.



Gastroschisis International (GiT) is a collaboration of seven paediatric surgical centres, in six countries across two continents, with a shared interest in GS.


| | |
|---|---|
| **A** | (1) St Mary's Hospital, Lacor (2) Mulago Hospital, Kampala, **Uganda** |
| **B** | Centre Hospitalier Universitaire, Treichville, Abidjan, **Côte d'Ivorie** |
| **C** | King's College Hospital, London, **UK** |
| **D** | George Mukhari Academic Hospital, Pretoria, **South Africa** |
| **E** | Queen Elizabeth Central Hospital, Blantyre, **Malawi** |
| **F** | National Hospital, Abuja, **Nigeria** |

The objectives of the collaboration include the provision of further evidence regarding the incidence and outcomes of GS, the identification of barriers to

better outcomes and the creation of networks to enhance the management and results of infants with this condition.

The Hugh-Greenwood Fellowship, awarded in 2014, contributed to members of the GiT team to carry out two site visits in June 2015; **(1)** Centre Hospitalier Universitaire, Abidjan, Côte d'Ivorie and **(2) (a)** St Mary's hospital, Lacor and **(b)** Mulago Hospital, Kampala, Uganda.

## 1. Côte d'Ivoire: 7-9th June 2015

Abidjan is the economic capital of the Côte d'Ivorie and is the most populated West African French-speaking city. Its population at the 2014 Census was 4,707,404, which is 20% of the overall population of the country. Considered the cultural crossroads of West Africa, Abidjan is characterized by a high level of industrialisation and urbanisation.

There are 3 main public hospitals in Abidjan, located in Treichville, Cocody and Yopougon. They are the backbone of the countries healthcare since most Ivorian doctors were educated in those hospitals, and have good specialty services but are limited by lack of funding. There are also many community healthcare centres and several private hospitals.


Hospitalier et Universitaire de Treichville was established in the Treichville neighbourhood of Abidjan in 1938, becoming a university hospital in 1976. It is comprised of several departments, for both emergency services and consultations and has a capacity of 658 beds.

# 3 Trip summary

This was the primary visit (2 days) to the Hospitalier et Universitaire de Treichville. The primary objective was to facilitate a GiT workshop: identifying action points for the improved management of infants with GS in collaboration with the local team, which were feasible to be achieved with their current resources.

**UK based team on trip – King's centre for global health, King's College, London**

- Mr Niyi Ade-Ajayi (Consultant Paediatric Surgeon)
- Miss Kat Ford (Global Surgery Fellow, Paediatric Surgery Fellow)

**Local contacts – Treichville, Abidjan**

- Professor Rouma Bankole (Consultant Paediatric Surgeon)
- Dr Olivier Moulout (Paediatric Surgery Resident)

**Attendees** (n=35)

- Paediatric nurses, paediatricians, neonataologist, paediatric surgery interns, residents and consultants from Treichville, Cocody and Yopougon.

**Equipment taken on trip**

- Laptop & lectures (powerpoint) and simulation/training videos
- Laminated example management protocol x3
- Copies of relevant publications, Lancet commission[1] x1
- Feedback forms and pre- and post-course questionnaires x40
- Grab bag x1
- Cling film x3

[1] Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. John G Meara, Andrew J M Leather, Lars Hagander, Blake C Alkire, Nivaldo Alonso, Emmanuel A Ameh, et al. The Lancet 2015: 386; 569–624.

- GABBY (GS simulation doll[2]) x5 (loaned from King's College Hospital), sausages x3 packs
- Preformed silo (PFS) x19 (donated by Medicina): size 3 x8, size 5 x 3, size 6 x7, size 45 x 1, size 35 x1.

**Overview of GS specficic medical and surgical resources in Hospitalier et Universitaire de Treichville**

- Neonatal unit
    - Two neonatal consultants, six trainees and a nursing team.
    - There are approximately 18 incubators, with no facilities to ventilate neonates. Bag-and-masks for manual respiratory resuscitation.
    - The surgical neonates are not cared for by the neonatal team – the surgical team co-ordinates their management.
- Resuscitation
    - 24G cannulas. It was reported that it takes 2hours on average to cannulate a neonate. The nurses and doctors attempt cannulation alike.
    - 0.9% saline for bolus fluids and 10% glucose for maintenance fluids.
    - Nasogastric tubes.
    - They do not have long line or parenteral feeding (PN) facilities and would not be able to fund PN.
- Covering the bowel

[2] GABBY: An *ex vivo* model for learning and refining the technique of preformed silo application in the management of gastroschisis. Dabbas N, Muktar Z, Ade-Ajayi N. African Journal of Paediatric Surgery 2009; 6: 73-76.

- The three hospitals do not have pre-formed silos (PFS). They primarily attempt primary closure or coverage with a surgical silo.

The itinerary is shown below:

| Sun 7th | | Mon 8th | | Tues 9th |
|---|---|---|---|---|
| LHR 11:05 → Abidjan 19:30 Brussels airways | 09:00 | Ward round | 09:00 | Video of application of PFS |
| Hotel Ibis | 11:00 | Welcome<br>Pre-course questionnaire | 09:30 | Recap, management protocol, GABBY (simulation model) |
| | 11:30 | GS – historical perspectivev(NAA) | 10:00 | Silo simulation – GAstroschisis BaBY (GABBY) |
| | 13:00 | Lunch | 11:00 | Small groups – scenario, discussion and identification of 5 problems and 5 solutions |
| | 14:30 | Local experiences of GS in Treichville (OM) and Cocody hospitals | 13:00 | Lunch |
| | 15:00 | Global surgery and GiT (KF) | 14:00 | Group discussion, identification of action points |
| | 16:00 | Close | 15:30 | Close |
| | | | Abidjan 23:00 → LHR 10:15 (10/5/15) | |

**Ward round**

The ward round provided us with insight into where and how children and neonates are cared for. There is a paediatric surgery multi-disciplinary team consisting of several consultants, 8-10 interns and residents and 2 nurses. The interns lead the round and three wards and the neonatal unit were visited.

Example conditions seen included osteomyleitis, sickle cell disease, limb fractures, Hirschprung's disease, anorectal malformations, peritonitis, typhoid perforations

and neonatal bowel obstruction (volvulus and atresia). A doctor on the ward round said that they 'tried their best but… are… limited by resources'.

***Lectures: (1) GS – a historical perspective, (2) Local experience – Treichville & Cocody, (3) Global surgery, GiT – phase 1 results, (4) Management protocol & grab bag***

The course was conducted in an air-conditioned conference room with projector facilities. We presented all lectures in English (see feedback) and translation was facilitated by some members of the audience following each slide.

***(1) GS – a historical perspective (Mr Niyi Ade-Ajayi)***

- Three aims: know your enemy, don't waste time, teamwork
- Summary of the change in management of GS in HIC and evidence behind practice


***(2) Local experience – Treichville & Cocody***

- The presentations provided more information regarding the local experience and outcome of infants with GS.
- Cocody reported on 9 infants over a 5-year period where there was 100% mortality. One of these patients was premature. They have observed a gradual increasing trend in prevalence. Causes of mortality included: delayed presentation, septicaemia and problems with nutrition.

- Treichville reported 16 patients over a 3-year period (approx. 5patients/ year). The mean age at admission was 7 hours. Approximately half of the infants were out-born. Causes of mortality included gangrenous and ischaemic bowel and sepsis. The mean age at death was 7.8 days (range 0 - 28 days).

- Yopougon did not present their experience formally.

***(3) Global surgery, GiT – phase 1 results***

- Global surgery as a concept, the Lancet commission and the shift in attention towards surgery in the global health agenda.

- GiT & phase 1 results – GS outcomes in the seven collaborating centres (this has been submitted for publication in the Journal of Paediatric Surgery).

- Questions regarding differences in outcome in the different low income countries (LIC) (e.g. why is mortality in Cote d'Ivoire 100% and <70% in Malawi?). We explained that the resources in the Malawi hospital are likely to be more sophisticated as the hospital has private income.

- The Lancet commission on Global Surgery was discussed in detail, particularly the key messages[3].

***(4) Management protocol & grab bag***

- Draft management protocol and grab bag were put forward and met with agreement, subject to change according to local resources and capability.

[3] Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. John G Meara, Andrew J M Leather, Lars Hagander, Blake C Alkire, Nivaldo Alonso, Emmanuel A Ameh, et al. The Lancet 2015: 386; 569–624.

***Simulation – GABBY (gastroschisis baby)[4]***

- A preformed silo (PFS) is a silastic sheath which has been adopted by some paediatric surgeons for the primary management of the exteriorised bowel in GS (see simulation photographs below).[5] It allows for conservative management of the bowel, usually avoiding a general anaesthetic and reducing fluid and heat loss. Gradual reduction of the bowel into the abdominal cavity is achieved via taxis. Sometimes a cotside, sutureless closure of the abdominal wall is performed.

- A video demonstrating the technique of using a pre-formed silo (PFS) was presented.

- X5 GABBY's with sausages simulating bowel were used. PFS donated for teaching purposes by Medicina (international representative: Jamie Harrison) were used. Three PFS were left behind as they were contaminated with sausage meat. Two GABBY dolls also donated to Treichville for teaching purposes.

- This received excellent feedback and the theory behind the PFS was understood.

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the management of gastroschisis. Dabbas N, Muktar Z, Ade-Ajayi N. African Journal of Paediatric Surgery 2009; 6: 73-76.

[5] Benefit of Preformed Silos in the Management of Gastroschisis. Allotey, J, Davenport M, I Njere, Charlesworth P et al. Paediatric Surgery International 2007; 23: 1065-69.

***Small group task – scenario, identification of 5 problems & 5 solutions***

- Groups of five were formed and the scenario of a 37-week neonate with GS being referred from a nearby district hospital presented. Groups were asked to discuss the scenario and present 5 problems that would be encountered during the management of this infant and 5 potential solutions.

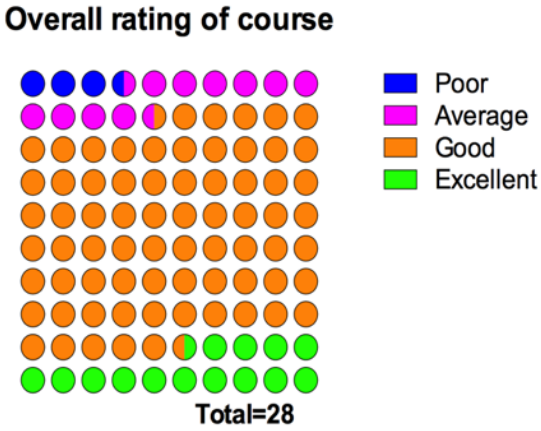
- Identified problems included:
  - Transport
  - Bowel iscahemia
  - Financial
  - No PFS
  - IV access
  - Hypothermia
  - Hypoglycaemia
  - Dehydration
  - Infection
  - Extent of eviscerated bowel
  - Prematurity
  - Antenatal diagnosis

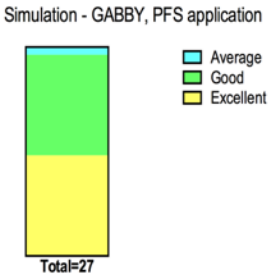
- Lack of expertise

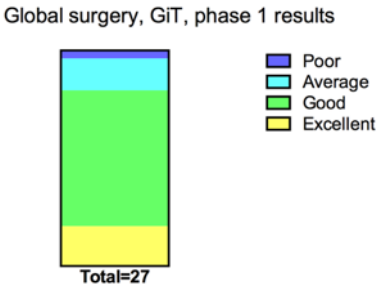
- Identified solutions included:
  - Attention to resuscitation: ABC
  - IV access, IV fluids & antibiotics
  - Incubator
  - Cling film, monitor the bowel
  - Silo application
  - Blood tests, blood gas
  - NGT and aspirate
  - Rapid transport – needs to have incubator & 02 facilities
  - Teamwork
  - Antenatal diagnosis

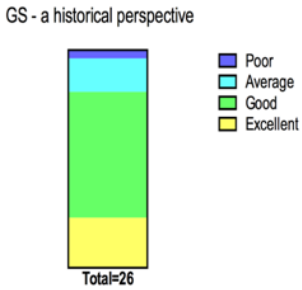
## Feedback

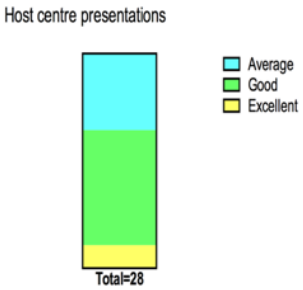
- 28 attendees returned feedback forms.
- A majority of attendees (n=20) rated the course as ‘good’ (see opposite).
- A majority of presentations, small groups sessions and simulation were rated as ‘good’ or ‘excellent’ (see below).

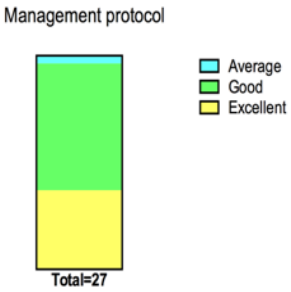


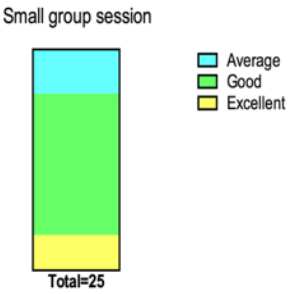




- The major limitation (subjectively and objectively from feedback) was the language barrier. Future trips should involve booking an interpreter or presentations to be delivered in French.

**Agreed action points**

1. Development of regional (Abidjan-wide) protocol for management of GS (OM/RB/KF/NAA).
2. Formation of regional GS registry (Treichville, Cocody, Yopougon) and regular reporting to twice monthly paediatric surgery meetings and GiT (OB/RB).
3. Provision of grab bags and sponsorship for contents (KF/NAA).
    a. Confirmation of how the contents be renewable.
4. Infants to be managed under joint care (surgeons and neonatologists) in the neonatal unit (RB/neonatal team).
5. Identify a champion in each of the three centres and encourage regular communication (OM/KF).

**Further action points discussed:**

1. Improve transport between centres in Abidjan.
2. Preservation of veins:
    a. Encourage senior, experienced individual to attempt peripheral IV cannulation.
    b. Potential for future visit with IV access, including central lines, workshops.

## 2. Uganda: 20-27th June 2015

Uganda is a landlocked country in East Africa whose diverse landscape encompasses the snow-capped Rwenzori Mountains and immense Lake Victoria. Its abundant wildlife includes endangered gorillas and chimpanzees as well as rare birds. Remote Bwindi Impenetrable National Park is a famous mountain gorilla sanctuary, while Murchison Falls National Park in the northwest is known for its 43m-tall waterfall and wildlife such as hippos.

- *Capital*: Kampala
- *President*: Yoweri Museveni
- *Currency*: Ugandan schilling
- *Population*: 37.58 million (2013 world bank)
- *Official languages*: English, Swahili

Since the late 1980s Uganda has rebounded from civil war and economic catastrophe to become relatively peaceful, stable and prosperous. In the 1970s and 1980s Uganda was notorious for its human rights abuses, first during the military dictatorship of Idi Amin from 1971-79 and then after the return to power of Milton Obote, who had been ousted by Amin. During this time up to half a million people were killed in state-sponsored violence. After becoming president in 1986 Yoweri Museveni introduced democratic reforms and was credited with substantially improving human rights, notably by reducing abuses by the army and the police.

**Health**

- Life expectancy is around 54 years.
- Child mortality (< 5 years) occurs in 90 of every 1000 live births.
- Total health expenditure as a percentage of GDP was 8% in 2012 (below the Abuja target of 15%).

Uganda was hit very hard by the outbreak of the HIV/AIDS epidemic in East Africa. In the early 1990s, 13% of Ugandan residents had HIV; this had fallen to 4.1% by the end of 2003, the most effective national response to AIDS of any African country.

Uganda is home to the Uganda Virus Research Institute (UVRI), considered one of the most advanced viral research facilities in East Africa and one of the three countries where the randomised controlled trials for male circumcision were conducted to inform the WHO decision on the Voluntar medical circumcision as a policy.

Uganda's health system is divided into national and district-based levels. At the national level are the National Referral Hospitals, Regional Referral Hospitals and semi-autonomous institutions. The lowest rung of the district-based health system consists of Village Health Teams (VHTs). These are volunteer community health workers who deliver predominantly health education, preventive services and simple curative services in communities. They constitute level 1 health services.

The next level is Health Centre II which is an out patient service run by a nurse. It is intended to service 5,000 population. Health Centre III services 10,000 people and provides in addition to HC II services, in patient,
simple diagnostic and maternal health services. It is managed by a clinical officer. Health Centre IV is run by a medical doctor and provides surgical services in addition to all the services provided at HC III. HC IV is also intended to provide blood transfusion services and comprehensive emergency obstetric care.

## Trip report

This week-long trip to Uganda saw visits to St Mary's Hospital (4 days) in northern Uganda and Mulago Hospital, Kampala (2 days). Local contacts were: Dr Martin Ogwang, Consultant General Surgeon in St Mary's, and Dr John Sekariba, Consultant Paediatric Surgeon, Mulago.

**GiT Team:** Niyi Ade-Ajay (Consultant Paediatric Surgeon King's College Hospital (KCH)), Kate Tavener (Neonatal and Paediatric dietician, KCH), Sarah Bradley (Neonatal Advanced Nurse Practitioner, St George's Hospital), Kat Ford (Paediatric Surgical Fellow, Global Surgery Fellow, KCH).

**St Mary's Hospital**

**Mulago Hospital, Kampala**

Built in 1917, Old Mulago Hospital merged with the New Mulago Hospital in 1960 to form Mulago Hospital Complex. The complex also houses Makerere University College of Health Sciences. It serves as a National Referral for the entire country and a general hospital as well as Health Center IV, III for the Kampala metropolitan. Official bed capacity is 1790.

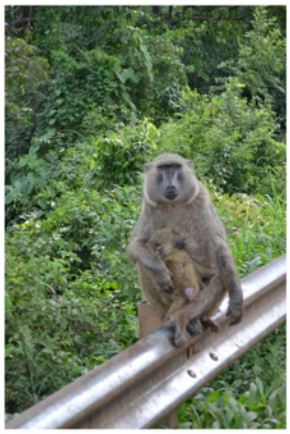
**Itinerary**

**Saturday 20/06/2015**

- Flight Heathrow 12:30 → Entebbe 23:00
- Guesthouse in Kampala


**Sunday 21/06/2015**

- 7-hour bumpy ambulance ride heading north from Kampala to Gulu



•Spacious guesthouse (where we were to sleep and have 3 meals a day during the visit) on the St Mary's campus

**Monday 22/06/2015**

**8:30am**

•Met Martin Ogwang, a cheerful engaged surgeon

- A guided tour, UK team impressed by attention to paediatric and neonatal nutrition (gynaecology, obstetrics, surgery, medicine, paediatrics (<6 years), ITU, neonatal unit, blood bank, pharmacy, microbiology, biochemistry, haematology, OPD, A&E, theatres (x6))


**3pm:** welcome, GS in perspective (NAA)

- Thomas Okella (General Surgeon), Richard Okelko (Paediatrician), sisters (A&E, midwife, paediatrics, medicine), dietician, anaesthetist
- Discussion regarding local experience of GS:
    - 90s – primary closure, 1-2 survivors (hernia as complication), even the small number of survivors act as an encouragement, the one that survived – father was educated, came from 120km on D4, the ones that die tend to die D7-14 from probable sepsis
    - They have seen no improvement in survival from carrying out primary closure
    - No antenatal diagnosis, 50% babies born at home, but even the ones inborn do not survive
    - They are managed on ICU, no involvement from NICU, paediatricians visit
    - **Venous access** – no PN, peripheral lines until exhausted, umbilical vein catheter - only suitable if baby is inborn but could be an option
    - 1 GS/month over past 2.5 years, noticed the patients are coming from one area, young mothers (15-18yrs), tend to arrive late (e.g. 3 days) as Lacor acts more like a tertiary referral unit

- **Attitude:** Culturally often family elders make decisions not to take the infant to hospital, perhaps some birth attenders have a similar attitude, congenital anomalies – families ask 'what is the cause', young, scared mothers
- In addition, prognosis given in the hospital setting is often negative, as they generally see a 100% mortality
- Babies often turn up to A&E where there is no clear protocol about how to manage these often septic, profoundly dehydrated infants.

**Tuesday 23/06/2015**

**AM:** NAA & KF theatre (herniotomy, adrenalectomy), SB & KT: fact finding on neonatal and paediatric wards

**3pm:** Further talks led by UK team:

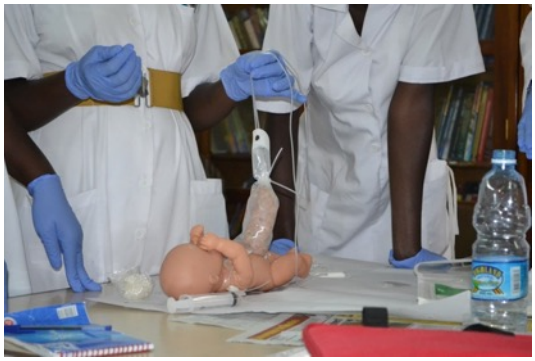
SB – IV access and demos: peripheral access, central lines and UVC

KT – parenteral feeding

KF – global surgery, Lancet Commission and GiT

**Wednesday 24/06/2015**

**10am**: management protocol, grab bag, application of PFS simulation (GABBY, Baby G) (KF)



**12:30:** enteral nutrition (KT)

**13:00:** lunch

**15:00:** small group scenarios

**Thursday 25/06/2015**

- Eagle air Gulu – Entebbe
- Straight to Mulago hospital from airport to meet John Sekabira

**2pm: lectures**

- NAA – GS, a historical perspective
- Anne (Mulago surgical resident) – 1 year prospective GS data (n=42, 100% mortality)
- KF – Global surgery, GiT
- SB – IV access

Lacor guesthouse overnight

**Friday 26/06/2015**

**9am: lectures**

- SB – further IV access, focus on UVC access (using simulated models for umbilicus)

- KT – enteral feeding
- KF – management protocol, simulated immediate management and PFS application
- Simulation: x2 GABBY (sausages used), Baby G
- Small group scenarios (3 groups) → development of local GS mangement protocol (see below)

**<u>Example Protocol for Management of Gastroschisis in Mulago Hospital</u>**

If **outborn** be prepared to give advice to referring units and have discussions at senior level.

**Arrival of infant:**

**- Casualty**

1. Alert gastroschisis team
2. Full examination of infant
3. Commence neonatal resuscitation as required
4. Dry infant and maintain normothermia
5. Obtain IV access
6. Bolus IV fluids: 0.9% saline 20ml\kg
7. Administer IV antibiotics *(gent, amp, dose)*

8. Insert nasogastric tube (**size 6-8**) and aspirate stomach contents
9. Attention to gut:
    a. Inspect: noting colour, untwist any kinks
    b. Clean dirt with warm saline
    c. Centralise and cover with clear film (polythene)

**- Neonatal unit/SCBU**

1. Maintain nil by mouth
2. Hydration and fluid management
    a. ***Bolus*** 0.9% saline 20ml/kg – reassess and be guided by physical (skin turgor, fontanelle, sunken eyes, pulse volume, urine output, capillary refill) and vital signs
    b. ***Maintenance*** – dextrose saline, consider transition to ring's lactate Day 3 as per IV fluid regimen
        i. Day 1: 60ml/kg/24hrs
        ii. Day 2: 90ml/kg/24hrs
        iii. Day 3: 120ml/kg/24hrs
        iv. Day 4: 150ml/kg/24hrs
    c. ***Replacement*** ml:ml- ringer's lactate
        i. Nasogastric aspirates
        ii. Fluid loss from gut
3. Continue regular IV antibiotics
4. Maintain normothermia
5. Decompress gut
    a. Nasogastric tube: on free drainage and hourly for first 24hrs, 2 hourly aspirates after
    b. Rectal washouts: warm saline 20ml/kg flush
6. Management of viscera: primary closure/surgical silo/PFS and reduction by taxis
7. Analgesia: rectal paracetamol, oral sucrose
8. Considerations for feeding, encourage and educate parents re. milk expression

**Surgery**

1. Ensure infant is adequately resuscitated and stabilised before general anaesthesia
2. Consider sutureless closure.

**Post-operative**

1. Anorectal stimulation
2. Commence feeding: when aspirates <20ml/kg/day and reducing
    a. Feeding can continue when aspirates are green
    b. Feed as per special care feeding protocol
    c. Continue increasing feeds in the absence of vomiting

## Acknowledgements

This work would not be possible without the generous contribution of members of the GiT time including annual and study leave. We would also like to acknowledge Medicina for the donation of the PFS, and the King's Centre for Global Health for its support.