

Local Guideline



John Hunter
Children's Hospital
CHILDREN, YOUNG PEOPLE AND FAMILIES



Health
Hunter New England
Local Health District

Gastroschisis in the neonate

Sites where Local Guideline applies	Neonatal Intensive Care Unit, JHCH
Target audience:	NICU clinical staff, which provides care to neonatal patients with gastroschisis.
Description	Guideline for the management of infants with abdominal wall defects such as gastroschisis in Delivery suite and NICU
This Local Guideline applies to:	
1. Adults	No
2. Children up to 16 years	No
3. Neonates – less than 29 days	Yes
Keywords	Approval gained from the Children Young People and Families Network on 20/10/2014 Abdominal wall defect, Bowel, Exomphalos, Gastroschisis, Malrotation, Omphacoele, vac dressing
Replaces Existing Local Guideline and Procedure	Yes
Registration Number(s) and/or name and of Superseded Documents	5.8.6 Guideline for the Management of Abdominal Wall Defects
Related Legislation, Australian Standards, NSW Health Policy Directive, NSQHS Standard/EQUIP Criterion and/or other, HNE Health Documents, Professional Guidelines, Codes of Practice or Ethics:	
<ul style="list-style-type: none"> NSW Health Policy Directive 2007_079 Clinical Procedure Safety http://www0.health.nsw.gov.au/policies/pd/2014/pdf/PD2014_036.pdf NSW Health Policy PD 2005_406 Consent to Medical Treatment http://www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_406.pdf NSW Health Policy Directive PD 2007_036 Infection Control Policy http://www.health.nsw.gov.au/policies/pd/2007/pdf/PD2007_036.pdf NSW Health Policy Directive PD 2010_062 Antenatal Maternal Referral/Transfer: Known Congenital http://www0.health.nsw.gov.au/policies/pd/2010/pdf/PD2010_062.pdf 	
Prerequisites (if required)	N/A
Local Guideline Note	This document reflects what is currently regarded as safe and appropriate practice. The guideline section does not replace the need for the application of clinical judgment in respect to each individual patient but the procedure/s requires mandatory compliance . If staff believes that the procedure/s should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patients' health record.
Position responsible for the Local Guideline and authorised by	Dr Paul Craven. Director of Newborn Services NICU JHCH
Contact Person	Jennifer Ormsby, CNE (Relieving) NICU JHCH
Contact Details	Jennifer.Ormsby@hnehealth.nsw.gov.au Phone 02 49855304
Date authorised	20/10/14
This Local Guideline contains advice on therapeutics	No
Date of Issue	15/12/14
Review due date	15/12/18

Note: Over time links in this document may cease working. Where this occurs please source the document in the PPG Directory at: <http://ppg.hne.health.nsw.gov.au/>

RISK STATEMENT

This local guideline has been developed to provide guidance to clinical staff in NICU when caring for an infant with a gastroschisis. It ensures that the risks of harm to infants and staff are identified and managed.

Any unplanned event resulting in, or with the potential for injury, damage or other loss to infants/staff/family as a result of this management must be reported through the Incident Information management System and managed in accordance with the Ministry of Health Policy Directive: Incident management PD2007_061. This would include unintended injury that results in disability, death or prolonged hospital stay.

RISK CATEGORY: *Clinical Care & Patient Safety;*

OUTCOMES

1	Delivery at JHH will enable expert teams of surgeons and Neonatal clinicians to avoid trauma to the bowel and ensure heat, fluid and electrolyte loss is minimised at and immediately post-delivery.
2	Surgery will be performed following consultation with surgeons
3	Parents will be kept informed throughout admission of plan of care, investigations and prognosis
4	For infant to commence oral feeds as soon as possible

ABBREVIATIONS & GLOSSARY

Abbreviation/Word	Definition
ABG	Arterial blood gas
BSL	Blood sugar level
DDA	Dangerous Drugs of Addiction
EUC	Electrolytes, Urea and Creatinine
FBC	Full blood count
IV	Intravenous
JHH/JHCH	John Hunter Hospital/John Hunter Children's Hospital
MO/NNP	Medical Officer/Nurse Practitioner
NICU	Neonatal Intensive Care Unit
PICC	Peripherally inserted central catheter
PIPP	Premature infant pain profile
PN	Parenteral Nutrition
PR	Per rectum

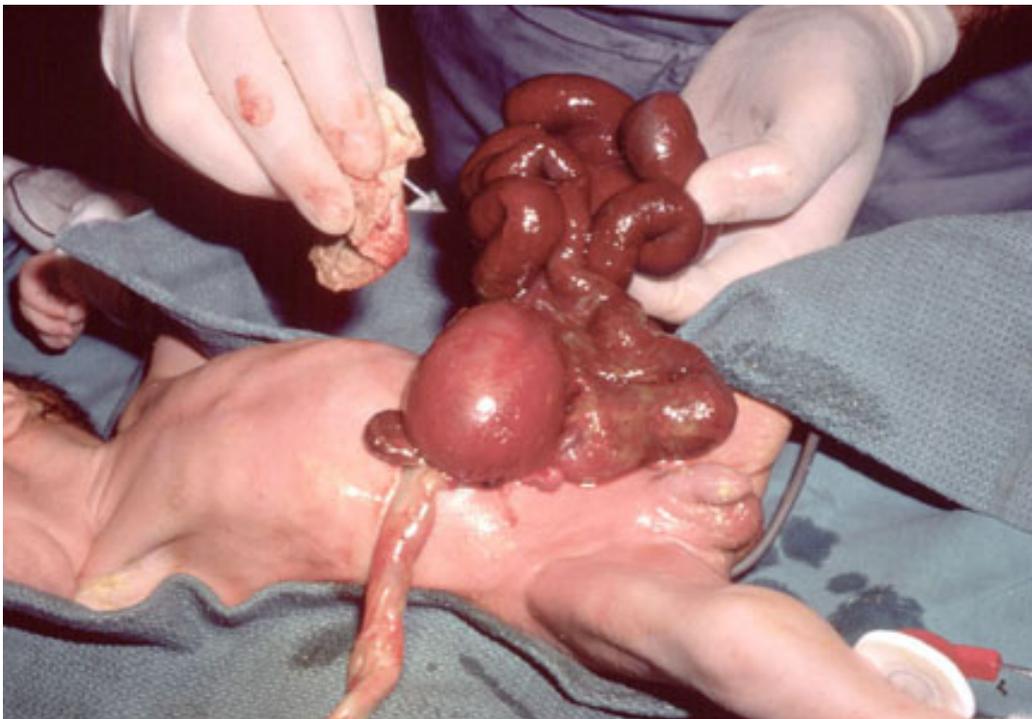
GUIDELINE

GASTROSCHISIS

Definition

Gastroschisis is a defect in the full thickness of the abdominal wall that causes a variable amount of small and large bowel and occasionally other organs to protrude outside the body. There is no peritoneal covering over the bowel or other contents which causes evisceration and suspension of the bowel in the amniotic fluid. The defect lies within the umbilical ring and mostly to the right of the cord insertion¹ (see photo below).

Gastroschisis varies from 1 to 5 per 10,000 live births and the occurrence of gastroschisis is 3-4 times more than an omphalocele with an increased incidence in younger mothers⁴. Apart from a risk of bowel atresia (10-15%), gastroschisis is not usually associated with other fetal developmental abnormalities⁵. The overall survival of babies with gastroschisis is over 90%⁶.



Gastroschisis with small and large bowel

<http://emedicine.medscape.com/article/975583-overview>¹³

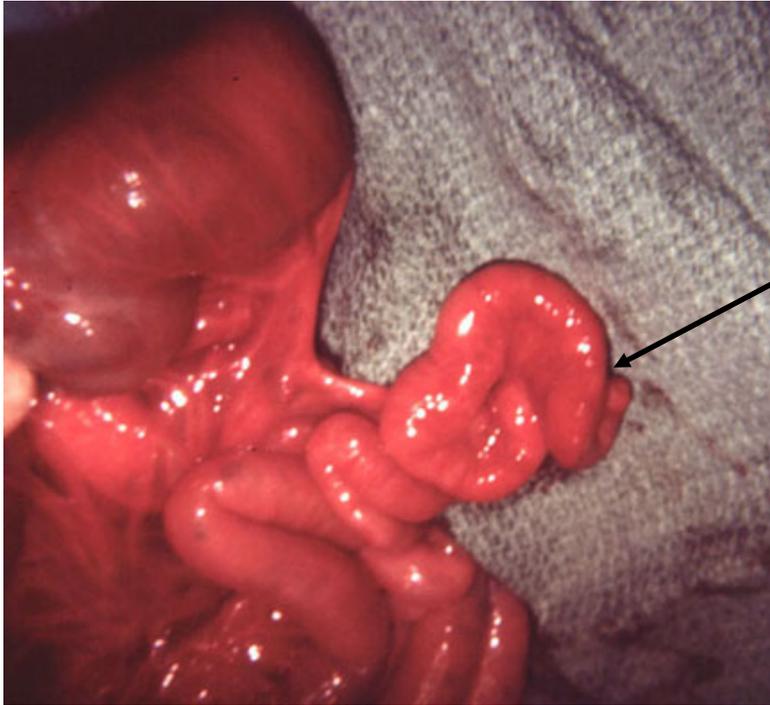
General guidelines for gastroschisis

- If an antenatal diagnosis of gastroschisis is made, the mother should be referred to a tertiary maternity hospital for the provision of antenatal counseling, performing investigations, stabilisation at delivery and surgical intervention².
- Delivery at JHH will ensure support from the NICU team as well as surgeons to minimize trauma to the bowel and to prevent rapid heat, fluid and electrolyte loss occurring. Parents would also get a chance to be given information and will become familiar with the NICU area prior to delivery

- Antenatally the mother should be seen at least once by the neonatologist and surgeon as well as be able to visit the NICU
- For a known gastroschisis, a management plan is usually formulated between 28 weeks and 32 weeks of gestation. This should be discussed with the parents and written in the case notes.
- There are no significant differences in short term outcomes for infants with a prenatal diagnosis of gastroschisis who are delivered vaginally⁷. This should be the preferred mode of delivery unless contraindicated by obstetric requirements.
- The NSW consensus meeting⁸ on abdominal defects advise that no elective delivery should take place before 37 weeks gestation unless there is foetal distress.

Delivery room management of an infant with gastroschisis

- Follow the Flow Chart (Appendix 1) for Gastroschisis.
- Ward reduction equipment box, metal frame and plastic wrap can be found on the shelf next to the DDA cupboard in Level 3 and should be kept ready in the NICU. Check that a silo is available in the equipment box if ward reduction has been planned. Spare silos available in theatres.
- The NICU will provide a MO/NP and nurse at delivery to provide resuscitation and care of the neonate with gastroschisis.
- Resuscitation is the initial priority for newborns with gastroschisis and once the baby has been stabilized, attention can move to care of the defect. Bag and mask ventilation should be avoided to minimise gas in the stomach and bowel. If respiratory support is required the infant should always be intubated with an endotracheal tube.
- Following stabilization, an oro-gastric tube should be inserted to decompress the stomach and avoid intestinal distension
- The infant should be dried and a warm environment maintained whilst protecting the exposed viscera to prevent heat loss. Due to significant evaporative water losses from the exposed bowel (up to 2 ½ times as much as in a healthy term infant), the gastroschisis should be kept moist by gently covering with plastic wrap. This is best achieved by initially wrapping the plastic film around the defect and then over the top. This preserves body heat and minimizes insensible water loss.
 - NOTE: This is a two-person procedure. Care should be taken not to twist or kink the bowel by ensuring the plastic wrap is not applied too tightly.
- Ensure the cord is cut as long as possible
- The umbilical vein may be used if necessary for resuscitation and fluids.
- It is important to position the baby and support the exteriorized bowel in such a way as to maintain best possible circulation to the bowel by taking tension off the mesenteric vessels. This is achieved by having the baby in the right lateral posture with support under the bowel¹.



Gastroschisis with associated intestinal atresia

<http://emedicine.medscape.com/article/975583-overview>¹³

Gastroschisis management

The main aim to improve outcomes for an infant with a gastroschisis is to return the exposed abdominal contents to the cavity in a way that minimizes damage to the bowel due to trauma or increased intra-abdominal pressure⁵.

Assessment is required to be by the surgeon to determine the best option of surgical management which may be either:

1. Primary reduction and surgical closure of the fascia in theatre
2. Placement of silo to enable reduction over a period of time (generally 1-14 days)⁵ in the NICU and subsequent delayed closure of fascia
3. Primary or delayed reduction without fascial closure

Surgical management with the appropriate option is a high priority due to ongoing fluid and heat loss from the exposed bowel wall.

Pre-operative care of defect

- Once the infant is stable, a thorough examination should be undertaken to assess the bowel for atresia, necrosis or perforation as well as exclude coexistence of other anomalies⁵
- Sterile latex free gloves should be used when handling bowel to minimise infection.
- Ensure defect remains covered with plastic wrap
- Wet gauze/cotton must NOT be used (threads stick to bowel and lead to more inflammation; and wet gauze also causes hypothermia)
- Prepare infant for a ward reduction or theatre
- Refer to CPG: [‘Surgery-Preparation and care of infant in NICU’ 5.8.2](#)

Fluid management

- Infant is kept Nil By Mouth
- A peripheral IV cannula should be inserted (preferably in upper limbs)
- Maintenance IV therapy of 10% glucose should be commenced at 80-100ml/kg/day
- 20 mls/kg bolus of sodium chloride 0.9% (normal saline) infused over one hour should be given to manage initial fluid losses
- After the initial fluid bolus, 10mls/kg/hour of sodium chloride 0.9% to replace ongoing losses will be required until the defect is closed and urine output of ≥ 0.5 ml/kg/hr is achieved. Plan for ongoing fluid management should always be discussed with the on call Neonatologist
- Accurate urine output should be measured and recorded (an indwelling urinary catheter may be required in some cases)
- Regular BP monitoring should occur (with either an arterial line or using NIBP monitoring with a cuff)
- FG 8-10 oro-gastric tube should be inserted and placed on free drainage. It then should be aspirated at least 2nd hourly
- Bloods to be taken for FBC, group and x-match
- Blood gas and BSL to be taken 4th hourly, EUC 8th hourly initially, then as per neonatologist

Drug and pain management

- Antibiotics should be administered to the baby as required
- Inotropic support if required
- Pain assessment score should be undertaken at least once a shift
- Pain relief will often be required and should be given in discussion with surgeon and neonatologist and review of the pain score. Consideration should be given to allowing sufficient time for the desired effect of pain relief medications prior to surgical management. Refer to CPG [JHCH NICU 03.04: 'Assessment and Management of pain in the Newborn'](#)

Surgical management

Rectal washout may be required and will be performed by Surgeon

- Equipment requirements are in the Ward Reduction Equipment Box

Primary Repair – ward reduction or in theatre under general anesthetic:

Primary repair is aimed for if possible and can usually occur if the defect is small. All contents are returned to the abdominal cavity and the fascia and skin closed. There are times when the surgeon is able to return the contents and then only close the skin and not the muscle/fascia layer. Local experience has confirmed the usefulness of ward reduction in simple gastroschisis.⁹

Silo reduction Christison-Lagay et al (2011)

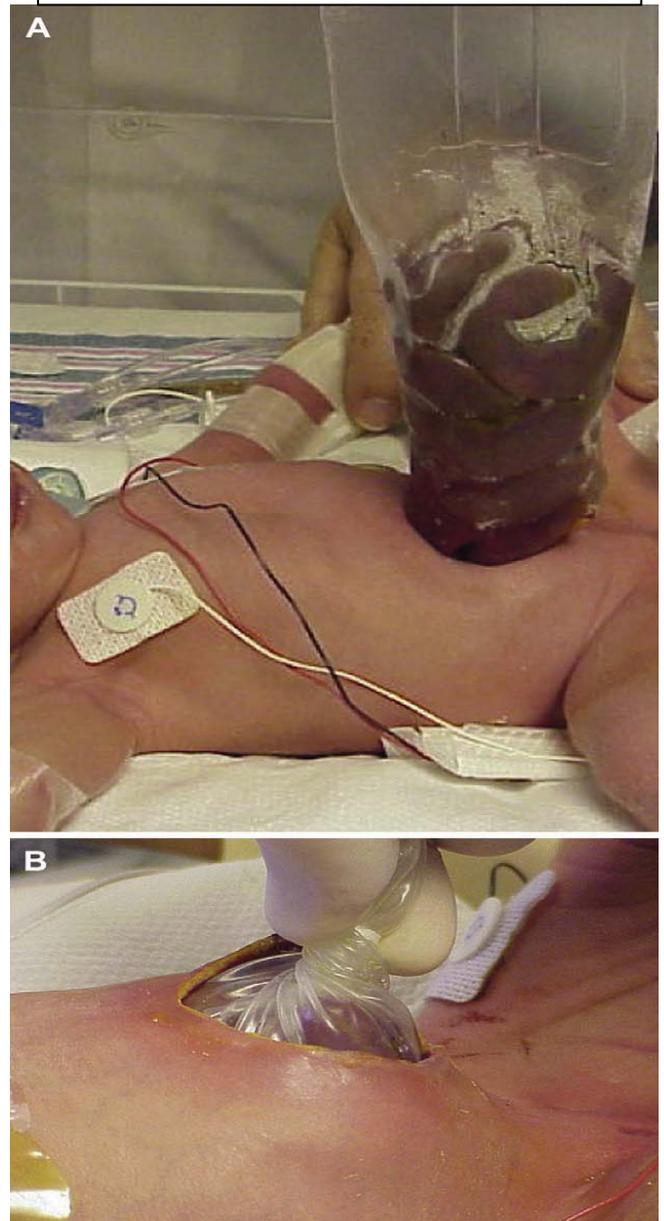
Staged Reduction:

If the defect is large, the surgeon may opt for a staged reduction. Not all organs are returned to the abdominal cavity. The organs remain outside the cavity and are covered by a mesh-reinforced spring-loaded Silastic Silo. This is suspended from the metal frame that has been placed in the open care crib and allows gravity and daily manual compression of the silo to aid the reduction process.

This procedure is usually performed in the ward and silos of two sizes (5 and 7.5 cms) are usually available in the Gastroschisis ward reduction box in the NICU. The bowel is then reduced once or twice daily into the abdominal cavity by shortening the silo space as shown in figures A & B. A staged reduction generally occurs over a period of up to 14 days¹⁰.

Skin flap Closure

Only the skin is pulled over the exposed organs and this is done when the fascia cannot be easily repaired initially.



Postoperative Care – Spring-loaded silo

- Standard observations for a baby in intensive care
- Prevent hypothermia
- Nurse the baby supine
- Care must be given to avoid accidental dislodgement of silo
- Fluid balance to be carefully monitored with electrolytes being done 6th hourly
- Large bore gastric tube to remain on free drainage and is aspirated 2-4th hourly. Aspirate losses should be replaced intravenously as prescribed
- Accurately measure and record urine output – 6th hourly urinalysis (signs of hypovolemia may be ↓ urine output and ↑specific gravity¹⁴)
- Observe for metabolic acidosis – ABG, serum lactate and BSL 4-6th hourly until stable

- Observe for progressive discolouration of the bowel within the silo and report if noted
- Observe for respiratory compromise due to increased bowel returned into peritoneal cavity causing increased pressure on the diaphragm
- Observe for inferior vena cava compression – mottling, cyanosis, and oedema of lower extremities, systemic hypotension
- Observe wound/suture line for colour, discharge, and signs of infection or breakdown
- Monitor pain (PIPP score) and provide appropriate analgesia
- Insertion of the PICC line is recommended and PN commenced for nutrition
- Introduce oral feeding in consultation with surgical team
- Provide support for parents and follow the Partnership in Care policy

Prognosis

Some infants with gastroschisis have very unfavorable bowel patho-anatomy when they are born. Sometimes they can have blockages in the bowel and others are covered with a thick inflammatory membrane known as 'peel'. If the blockages have been present for a long time, they can cause parts of the bowel to be greatly distended. Even when these blockages are relieved after birth it can sometimes take many months for the bowel to function normally and for the infant to establish feeds. They commonly have a long stay in hospital and require intravenous feeding of parenteral nutrition due to dysmotility of the bowel and malabsorption¹³.

Fortunately most infants do not have these types of problems and feeding is established within days of surgery. Minimal enteral feeds in the early post-operative period can decrease time to discharge and overall mortality¹¹. Most babies with gastroschisis are discharged within 3-4 weeks of birth.

New techniques

In the case of a giant omphalocele or Gastroschisis a Vacuum Assisted Closure (VAC) dressing maybe used ¹². This device uses negative pressure to assist in healing wounds and drawing wound edges together. For care of a negative pressure wound dressing – See Appendix in *CPG 'Omphalocele in the Neonate' JHCH_NICU_16.04*



REFERENCES

1. Ledbetter D (2006). Gastroschisis and Omphalocele. *Surgical Clinics of North America*, 86. 249-260
2. NSW Health Policy Directive PD 2010_062 Antenatal Maternal Referral/Transfer
3. Polin, R., Fox, W. & Abman (2004): *Fetal and Neonatal Physiology* (3rd Ed). Saunders Pennsylvania USA
4. Kirby,R.,Marshall,J.,Tanner,J.,Salemi,J.,Feldkamp,M.,Marengo,L.,Meyer,R.,Druschel,C.,Riskard,R. & Kucik,J. (2013). Prevalence and correlates of gastroschisis in 15 states, 1995 to 2005. *Obstetrics & Gynaecology*, 122.2.275-281
5. Christison-Lagay, E., Kelleher, C. & Langer (2011): Neonatal Abdominal Wall Defects. *Seminars in Fetal & Neonatal Medicine*
6. Holland A, Walker K & Badawi N. (2010) Gastroschisis: An update. *Paediatric Surgery International* 26: (9) 871-8
7. Abdel-Latif M, Bolisetty S., Abeywardana, et al. Mode of delivery and neonatal survival of infants with Gastroschisis in Australia and New Zealand. *J Pediatr Surg.* 2008; 43: 1685-1690
8. Notes from the peer review audit meeting relating to Gastroschisis Nov 2008 The Department of Surgery JHCH
9. Leadbeater K. Kumar R & Feltrin R. Ward reduction of gastroschisis: risk stratification helps optimise the outcome. *Pediatric Surgery International.* 26 (10): 1001-5, 2010 Oct
10. Brown, N., Flanigan, L., McComiskey, C. & Pieper, P. (2013) *Nursing Care Of the Pediatric Surgical Patient.* Jones & Bartlett Learning, Burlington MA USA. Chapter 15, 279
11. Poenaru D. (2012) in Avery's Diseases of the Newborn Chapter 71 Abdominal wall problems pp1011. 9th Edition. Elsevier Saunders. USA
12. Hassan S. & Pimpalwar, A. (2011) Primary Suture-less Closure of Gastroschisis Using Negative Pressure Dressing (Wound Vacuum) *Eur J Pediatr Surg* 21: 287–291
13. Glasser J. Pediatric Omphalocele and Gastroschisis. Medscape.

APPENDICES

1. Flow Guide for gastroschisis
2. Equipment for Ward reduction

AUTHOR:

Joanna Kent Biggs Nurse Educator (Acting) NICU JHCH
Jennifer Ormsby CNE (Rel) NICU JHCH

REVIEWER:

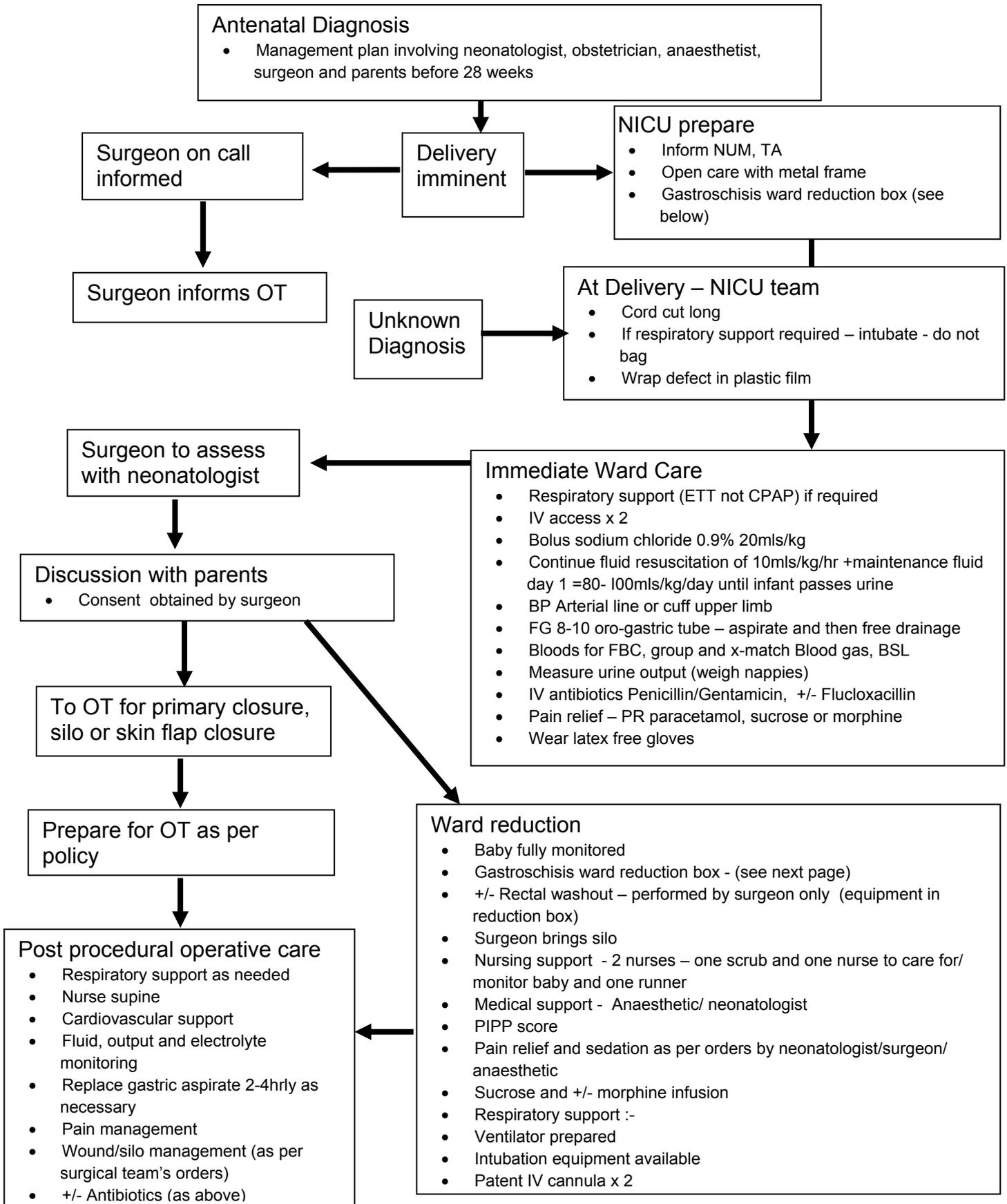
Dr Javeed Travadi Neonatologist NICU JHCH
Dr Aniruddh Deshpande Clinical and Academic Fellow, Paediatric Surgery JHCH
Justine Parsons NE NICU JHCH
Dr Paul Craven Neonatologist NICU JHCH
Michelle Jenkins Senior Pharmacist JHH
Koert de Waal Neonatologist NICU JHCH
Deborah Posetti RN NICU JHCH
John Cassey Paediatric Surgeon JHCH
Margaret Allwood CNE JHCH
Dr Rajendra Kumar Paediatric Surgeon JHCH
Lisa Jones RN NICU
Shirley Graham NUM2 NICU JHCH

APPROVED:

NICU Executive Committee 10/9/2014

Appendix 1

Flow guide for care of a baby with Gastroschisis in JHCH NICU



Appendix 2

Equipment required for Ward reduction of Gastroschisis

Boxes (kept in back storeroom), frame (on top of medication cupboard) and gladwrap roll (in 1st row of NICU storeroom)

1 Rectal washout box– performed by surgeon

- 200mls of warm sodium chloride 0.9%
- 1 x 50ml Toomey syringe
- 1 x 20 ml syringe
- 1 x FG 10 Foley catheter
- 1 x Nelaton Catheter 10FG
- “Bluey” pad
- 1 x small bowl

2) Abdominal Defects ward reduction box - Equipment for reduction

- 1 x each eye & ear drape
- 1 x sterile drape F6
- 2 x Steristrips 12mm
- 2 Large and small op sit IV 3000
- Skin closure sutures 3/0 / RB1 vicryl
- Benzoin compound (Friar’s Balsam)
- Hypafix - unsterile (10cm wide)
- Silk 0 suture (cord tie)

3) Extras

- Face masks with eye protection
- Sterile Gloves for 3 people
- Plastic Drapes, One large one small
- Gowns for 3 people
- Glad wrap roll

4) Surgeon brings

- Silo
- Mini instrument set (OT brings it with them)

Post reduction

Please identify what you used on stock replacement sheet (in box), sign form and then place box in the TA room