

bedside neonatal surgery



cathy e. shin
childrens hospital los angeles
department of surgery
university of southern california
keck school of medicine

So much medical progress

- In 1949 the overall mortality of neonatal surgery was 72%
- “except in the hands of a very few, very expert surgeons, operating on a small number of highly selected cases, the mortality for major operative procedures was forbiddingly high.”



Factors Improving Survival in Neonatal Surgery

- Growth of pediatric surgery
- Growth of pediatric anesthesia
- Improved understanding of newborn physiology
- Technological advances allowing improved monitoring
- Advances in airway management
- The development of total parenteral nutrition
- The advent of effective antibiotics
- The establishment of neonatal intensive care units

background

- Critically ill neonates in the NICU often require surgical procedures
- Neonates in need of surgery are traditionally transferred to the main operation room outside the NICU
 - Some hospitals- the OR may not be the safest place for neonates
 - Room temp, compatible sat probes, bp cuff etc



- The major indications for surgery in NICU are the procedures which are needed in neonates on mechanical ventilator or emergently in an unstable patient
- Most of these neonates are premature, very low birth weight (VLBW), may be on prolonged ventilator support and may need surgery for congenital or acquired conditions
- These neonates have high risk of transport related complication



- However, transferring the critically ill neonates to the OR outside the NICU risks complications
- In critical patients, previous studies have shown that clinical complications may occur in up to 70% of intrahospital transport
- Hypothermia
- change in variations in heart rate and blood pressure
- dislocation of vascular accesses or endotracheal tubes
- The incidence of complications may relate to the duration of transportation and the severity of the patients' symptoms
- Maybe do the operation at the bedside!





- To avoid the adverse events during transportation are done at the NICU bedside, with similar results to those done in the main OR
- Surgery at the NICU bedside avoids the accident during transport, especially for critical and unstable neonates who are in use of high-frequency oscillatory ventilation, inhaled nitric oxide therapy, and even extracorporeal membrane oxygenation (ECMO)
- Furthermore, performing the surgery in the NICU provides continuity of care by the same intensive care team

What neonatal surgeries had been done safely in NICU?



Table 4: Infrastructure needed for surgery in NICU

Instruments for surgery likely to be available in NICU	Extra instruments needed
Radiant warmer	Neonatal laparotomy set/THORACOTOMY set
LED light	Electrocautery and its accessories
Sterile drapes	Head lamp with LED light
Central oxygen, suction, compressed Air	Nitrous oxide cylinder, Sevoflurane
Neonatal ventilator	
Multi para Monitors(pulse oximeter, ECG, BP)	
Temperature monitoring system	

What neonatal surgeries had been done safely in NICU?

abdominal laparotomy drain for NEC in 1977

ligation of patent ductus arteriosus (PDA) in 1982

PDA ligation is the commonest surgery that has been safely performed in NICU

safe as well as cost effective

The surgical team goes to NICU and performs the surgery avoiding any shifting of the sick neonate, while maintaining the continuity of care

PDA

Table 1: published article of PDA ligation in NICU

S. no	Authors	Country	year	Number of cases	Outcome	Remarks
1	Eggert et al ¹	Utah, USA	1982	79	7 deaths due to prematurity	PDA ligation for preterm babies is safe
2	Taylor et al ²	Texas, US	1986	52	20 (not related to surgery)	Surgery in NICU recommended
3	Shenassa et al ³	Canada	1986	14 – OR 14 – NICU	Similar in both group	PDA ligation in NICU is more cost effective
4	Coster et al ⁴	Des Moines, USA	1989	115	3 deaths not related to surgery	Surgical closure preferred < 33 weeks over indomethacin. Closure performed in the neonatal intensive care unit eliminates transport risks and is ultimately safer and easier than transport to an operating room.
5	Kewitz G et al ⁵	Berlin, Germany	1991	35	Article in German	
6	Hoffmann M et al ⁶	Germany	1991	25	none	PDA ligation for preterm babies is safe
7	Huddleston KR. ⁷		1991	Details not known as no full text found		
8	Mortier E et al ⁸	Gent, Belgium	1996	33	2 deaths not related to surgery	PDA ligation for preterm babies is safe
9	Gavilanes et al ⁹	Maastricht, Netherlands	1997	45	Nil surgery related mortality	NICU is good place to perform surgery and no increased chances of infection PDA = 16 Other cases-Ventricular catheter for hydrocephalus = 14; CDH repair = 2; Lung biopsy = 2; Laparotomies = 12
10	Fanning ¹⁰	Dublin, Ireland	1998	25	36% mortality not related to surgery	Recommends surgery NICU
11	Gould et al ¹¹	Pennsylvania, USA	2003	72	7	It is better that cardiosurgery team goes to referring hospital for PDA ligation in their NICU than referring children to higher centers
12	Kuster et al ¹²	Paris, France	2003	22	Not related to surgery	morbidity can be limited by performing the surgery in an NICU, and by switching from conventional to high-frequency mechanical ventilation in case of severe respiratory failure
13	Lin CT et al ¹³	Hsien, Taiwan	2003	17	3 deaths not related to surgery	surgical closure of the PDA for the premature infant can be a safe and effective procedure performed in the NICU, when indomethacin closure is ineffective or contraindicated.
14	John et al ¹⁴	USA	2007		Assessed several problem areas, including communication issues regarding patient and unit readiness, design of instrument sets, and organization and transportation of surgical supplies and implemented solutions to these problems resulted in a decrease in the amount of time the surgical team spent in the NICU and more efficient surgical procedures	
15	Lee GY et al ¹⁵	Seoul, S Korea	2008	94, VLBW	20 deaths not related to surgery	PDA ligation of VLBWI performed in the NICU is safe without serious complications
16	KO Y C et al ¹⁶	Taiwan	2009	41 LBW [*]	5 deaths because of prematurity	suggest surgical closure as the primary treatment in very-low-birth-weight infants who are ventilator dependent to avoid the possible complications of indomethacin and prolonged intubation

PDA- Patent ductus arteriosus ,OR- Operation room;NICU - Neonatal intensive care unit; CDH- congenital diaphragmatic hernia

RESEARCH ARTICLE

Open Access



Bedside PDA ligation in premature infants less than 28 weeks and 1000 grams

Mustafa Kemal Avsar^{1*}, Tolga Demir², Cem Celiksular³ and Cenap Zeybek⁴

Abstract

Background: PDA (Patent ductus arteriosus) is a common and clinically important condition which is presented with a number of hemodynamic and respiratory problems such as intraventricular hemorrhage, pulmonary hemorrhage and necrotizing enterocolitis due to increased pulmonary blood flow and stealing from systemic circulation. The incidence of PDA among the infants that were born before the 28th gestational week is as high as 70%; and spontaneous closure rates in very-low-birth-weight premature neonates (VLBWP) is around 34%. The onset, duration, and repeat number of consecutive courses of the prostaglandin synthesis inhibitor medication for PDA closure are still issues of debate. Bed-side PDA closure is a safe surgical procedure in both mature and premature babies. Here we aim to retrospectively present our 26 cases which were less than 28 weeks and 1000 grams that underwent bed-side PDA ligation.

Methods: This retrospective study included 26 VLBWP with PDA that underwent bed-side ligation between 2012 and 2015. Babies were born before the 28th gestational week (23–27 weeks) and less than 1000 grams (489–970 gr). Of the 26, 15 were female and 11 were male. Indomethacin was administered to all of the cases as the medical closing agent. The medication was stopped due to unwanted effects in 6 cases. All of the patients took medical treatment before surgery.

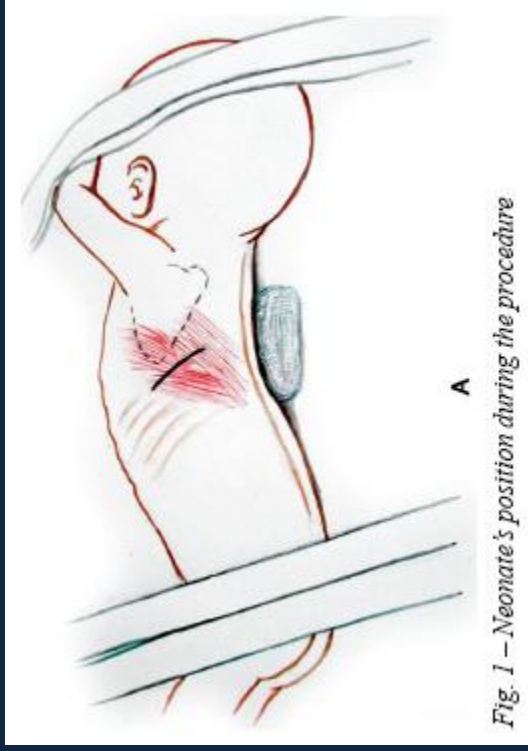
Results: No surgical mortality occurred during our study. One case of pneumothorax was recorded as late surgical complication. Five of the 26 patients were lost, and the most common cause of mortality was sepsis (in 3 cases). The remaining 21 cases were discharged on days 86–238. The follow-up periods of the patients were 2 months - 3 years. The most frequent problems encountered after discharge was chronic lung problems.

Conclusions: Bed side PDA ligation surgery in the ICU is a safe method for VLBWP with clinically significant PDA.

Keywords: Bedside surgery, Patent ductus arteriosus, Premature infant

PATENT DUCTUS ARTERIOSUS (PDA) LIGATION PROTOCOL NICU

- Radiant warmer: infant must be placed on radiant warmer that can move up and down.
- EKG Tracing: infant must have leads or limb leads on during surgery so that the anesthesiologist or surgeon can assess the EKG tracing on the monitor- keep left lateral chest free as possible for the prep
- pulse ox: on foot and volume of pulse ox high so everyone can hear
- Position of infant: infant must be positioned on right side with left side up (left thoracotomy)
- Infant needs to face the ventilator (make sure all IV lines and transducers are on opposite side of the way the infant is facing).
- -axillary roll under infants right side
- Position of the surgeon: surgeon will stand on the same side as the ventilator, so make sure that the ventilator is as close to the wall as possible
- Position of the anesthesiologist: please make sure that the anesthesiologist has IV access. Attach a microbore tubing (approximately 0.4mL) to the port which he/she will be using (make sure that the anesthesiologist is aware of how much flush (1 mL) is needed to flush the tubing so that the infant is sure to get the medication. {if blood products need to be administered the tubing will need to be changed to minibore tubing (approximately 1.5mL).



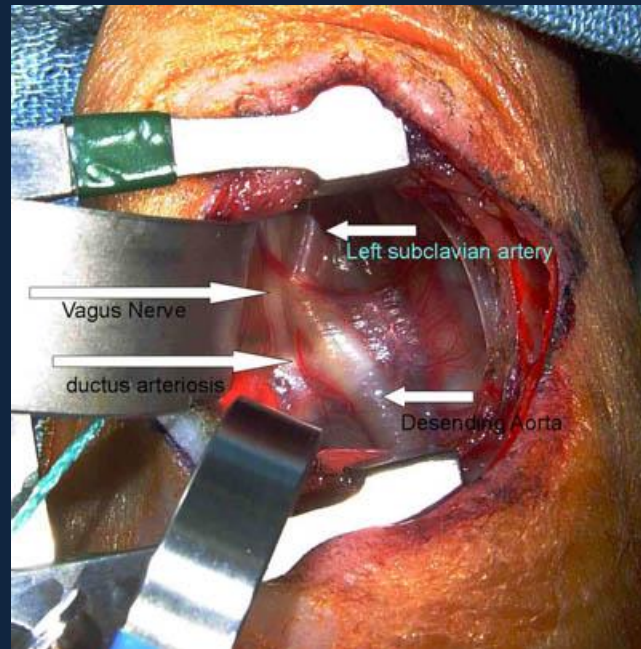




Special equipment:

- My loupes
- A head light
- appropriate size baby Bovie pad- babies are usually between 500-1.5 kg
- Bovie machine
- Neonatal Finochietto Rib spreader





What neonatal surgeries had been done safely in NICU?

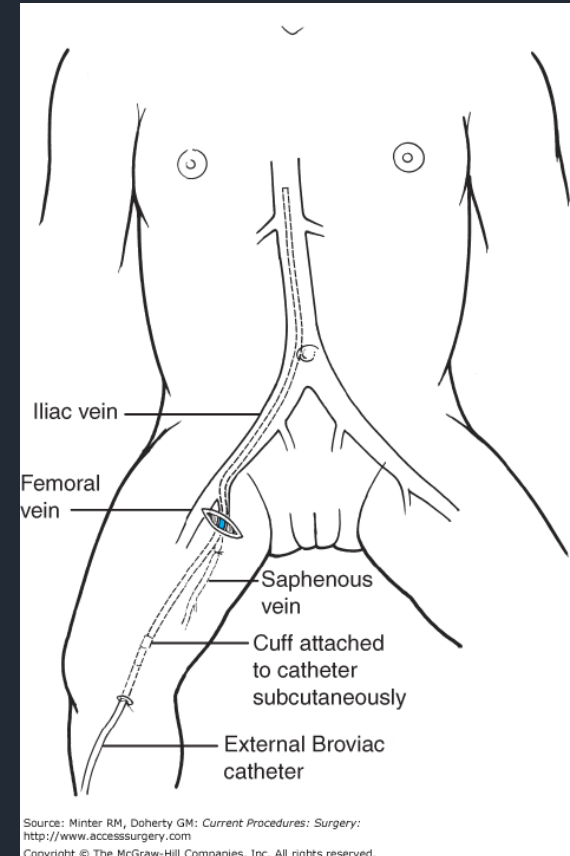
- Laparotomy for necrotizing enterocolitis (NEC) is the other commonly reported surgery that has been performed in NICU
- Most of these are sick unstable ventilated neonates
- CDH repair on ECMO



- tracheostomy
- central line placement – broviac catheters
 - Jugular or saphenous vein options
- abdominal wall defect repair
- stoma closure
- gastrostomy (emergent)

Broviac catheter insertion: operating room or neonatal intensive care unit

- We reviewed the records of all infants hospitalized in the neonatal intensive care unit (NICU) who underwent insertion of a Broviac catheter from July 1, 1984 through August 30, 1985.
- Broviac catheter insertion can safely be performed in the NICU without an increase in morbidity.
- Broviac catheter insertion in the NICU is less costly and saves transportation of the sick neonate to the operating room.



Bedside Neonatal Intensive Care Unit Correction of Congenital Diaphragmatic Hernia: Is Repair without Compromise?

- This study aims to evaluate the feasibility, safety, limitations, and outcomes of performing different surgical approaches and techniques for the bedside repair of congenital diaphragmatic hernia (CDH) in critically ill patients who cannot be transferred to the operating room
- 101 cases of CDH were operated on, of which 11 were in very critical condition and operated on at the bedside in the neonatal intensive care unit (NICU). The mean gestational age was 38.09 weeks, birth weight, 2.91 kg, and age at surgery, 10 days. All were on HFOV and inotropic support and had pulmonary hypertension. Nine of them were on nitric oxide. Mean preoperative parameters were as follows: O₂, 52%; mean airway pressure, 15; pH, 7.40; P_o 2, 88.5 mm Hg; and P_{co} 2, 47 mm Hg. Nine patients underwent laparotomy and two underwent thoracoscopy. All procedures were completed uneventfully.
- Bedside repair of CDH in the NICU while on HFOV is feasible and safe. It is not associated with any compromise in the surgical approach or technique.



Preoperative and postoperative characteristics and surgical related events among infants who received PDA and CDH repair

	NICU OR (<i>n</i> = 37)	Main OR (<i>n</i> = 28)	<i>p</i>
Pre-OP ventilator use	30 (81.1)	16 (53.5)	0.307
FiO ₂ pre-OP	30.2	27.4	0.735
FiO ₂ post-OP	31.0	40.9	0.027
MAP pre-OP (cmH ₂ O)	8.85	8.39	0.654
MAP post-OP (cmH ₂ O)	9.43	8.83	0.594
Waiting time (min)	34.4	63.6	0.001
OP duration (min)	70.4	101.1	0.001
BT pre-OP (°C)	36.8	36.9	0.929
Lowest BT (°C)	36.2	35.2	0.001
Hypothermia	3 (8.1)	11 (39.3)	0.008
IVF during OP (mL/kg/h)	11.6	18.8	0.067
Hyperglycemia	11 (29.7)	12 (42.9)	0.311
ET dislocation	0 (0)	1 (3.5)	0.422
Surgical related infection	1 (2.7)	4 (14.3)	0.104

Table 2: Published articles of surgery in NICU

S. no	Authors	Country	Year	Number of cases	Diagnosis & Procedure	Outcome	Remarks
1	Ein et al ¹⁷	Canada	1977	5	NEC Drain	2 Deaths	Peritoneal drainage recommended over open surgery
2	Besag et al ¹⁸	Bedford, UK	1984	2	Not specified	0	Recommends surgery in NICU
3	Lally et al ¹⁹	Los Angeles, USA	1987	31	Central line	Catheter related complications were e same as those put in the OT	Recommends central line insertion in NICU
4	Finer et al ²⁰	Alberta,	1993	81	Not specified	1 surgery related death	Recommends surgery in NICU for preterm sick babies
5	Frawley et al ²¹	Victoria, Australia	1999	233	NEC	9 deaths	Surgery in children < 1500g in NICU is recommended.
6	Klotz et al ²²	Rochester, USA	2001	57 patients	Tracheostomy	No complications	Tracheostomy in NICU as safe as in OT
7	Noble et al ²³	Tacoma	2001	8	Peritoneal drainage	4 deaths	Peritoneal drainage is not a definitive treatment but an adjunct
8	Lago et al ²⁴	Padua, Italy	2005	42	CDH	17 deaths	Recommended surgery in NICU for those neonates dependent on HFOV
9	Arbell Det al ²⁵	Jerusalem, Israel	2007	12	NEC	7 deaths	Bedside laparotomies are safe and feasible
10	Mallick et al ²⁶	Riyadh, Saudi	2008	37 cases, critically ill, unstable	Laparotomy, bowel resections and Stoma-12; repair of CDH- 7 ; ligations of PDA- 4; others-14	no mortality related to surgical procedures	Performing major surgical procedures in the the NICU is both feasible and safe
11	Parente A et al ²⁷	Madrid, Spain	2009	405	deferred thoracotomy closure- (172); placement of ECMO (42); ligation of PDA- (45), laparotomies for NEC-27; repair of CDH-20; plication of diaphragms (5); closing of gastroschisis-4.	No surgical complication related to location of surgery	NICU is a suitable place for surgical interventions in critical patients; less hypothermia in NICU group
12	Hall et al ²⁸	UK	2012	312 operations were performed in 249 infants.	Laparotomy -194;CDH- 36;Abdominal wall defect- 23;Central venous access -16;Tracheostomy-9;TEF- 8;Stoma closure -5;Gastrostomy- 3;Others 18	No surgical complication related to location of surgery	Operating on NICU is feasible and safe, and a full range of neonatal operations can be performed. Recommend this approach for all ventilated neonates and unstable neonates

surgical safety checklist

- shown to significantly reduce complication and death rates in surgical patients
- novel NICU bedside pre-procedural safety checklist to improve teamwork, communication and act as a learning tool for junior doctors performing these procedures

NICU Bedside Pre-procedural Safety Checklist

As the WHO surgical safety checklist – for PATIENT SAFETY, TEAMWORK, COMMUNICATION

GENERAL CHECKLIST BEFORE EVERY PROCEDURE

- Patient identification
- Parental consent/ informed
- Nurse present (comfort measures, support)
- Appropriate analgesia/medication
- Working Weight (kg)
- Pain assessment

PROCEDURE-SPECIFIC CHECKLISTS

ELECTIVE ENDOTRACHEAL INTUBATION

- Select appropriate tube
 - Oral tube
Length of insertion (cm)
= weight (kg) + 6
 - Size of tube (see table*)
- Monitoring – heart rate, O₂ sats (chest)

* Gestational age (weeks)	Weight (g)	Internal Diameter (mm)
<27	<1000	2.5
27 – 34	1000 – 2000	3
35 – 40	2000 – 3000	3.5
>38	>3000	4

UAC INSERTION

- Desired length of catheter (cm)
= 3 x weight (kg) + 9

UVC INSERTION

- Desired length of catheter (cm)
= 2 x weight (kg) + 5

LUMBAR PUNCTURE

- Signs of clinical instability – respiratory, cardiac, temperature, ongoing seizures
- Signs of increased ICP
- Consider clotting screen and platelets
- Signs of local infection
- Calculate mid-canal spinal depth (mm)
= 2 x weight (kg) + 7

INSERTION OF LONG LINE

- Is patient clinically stable?
- Monitoring – ECG and O₂ saturations throughout procedure
- Consider clotting screen and platelets
- Select appropriate catheter according to patient weight (27G if <1kg, 24G if >1kg)
- Measure length of insertion

- The WHO surgical safety checklist can be adapted to any complex procedure, including bedside procedures in NICU
- Safety checklists have been shown to improve teamwork, communication and adherence to process measures
- The NICU bedside safety checklist also acts as a useful learning tool helping junior doctors performing invasive procedures in NICU

Bedside Repair of Ruptured Omphalocele in Newborn: A Case Report

Prashant S Patil^{1*}, Rahul Kumar Gupta¹, Paras Kothari¹, Abhaya Gupta¹,
Ravikiran Kamble¹, K Vishesh Dikshit¹ and Geeta Kekre¹

¹Department of Pediatric Surgery, LTMMC & LTMGH Sion, India

Article Information

Received date: Oct 29, 2015

Accepted date: Dec 12, 2015

Published date: Jan 25, 2016

*Corresponding author

Prashant S Patil, Department of
Pediatric Surgery, LTMMC & LTMGH
Sion, India, Tel: +91-9423392432;
Fax: 0021674241384; Email:
docprashant2010@gmail.com

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Keywords Ruptured Omphalocele;
Cicatrisation; Beckwith-Widemann
syndrome

Abstract

Newborn presenting with ruptured omphalocele is an emergency which threatens the life of baby. We are reporting a case of a male newborn baby, born in hospital and had ruptured omphalocele sac during vaginal delivery. After reduction of herniated bowel excess omphalocele sac was excised and remaining sac was closed using absorbable suture material. Patient was kept NBM for 4 days and gradually started on feeds. On further evaluation patient was found to have Beck with –Widemann syndrome. Patient's karyotype was normal. Patient kept on regular follow-up with serial USG-KUB after discharge.

To our knowledge, there are only few reported cases of bed-side repair of ruptured omphalocele sac. This case is presented for its simple and effective bed-side management.

Introduction

Due to advances in pediatric anesthesia and resuscitation surgical and overall management of omphalocele has improved in recent years [1-3]. Ruptured omphalocele sac has been managed by using prosthetic material to close the abdominal wall defect. The cost of prosthetic material is an issue in developing countries. Hence an alternative for closure of abdominal wall defect in the form primary closure of omphalocele sac is described here in our case.

Our patient also had phenotypic features of Beckwith-Widemann syndrome. Karyotyping was 46 XY .baby is being followed with serial abdominal sonography.

Case Report

A male newborn baby, 3.2 kg, born in hospital, referred to us for management of ruptured omphalocele sac.

LETTER TO THE EDITOR

Bedside Repair of Omphalocele

Yavuz Yilmaz,* Gulsum Kadıoğlu¹, Hulya Ozkan-Ulu, Sema Arayıcı¹, Omer Erdeve¹

Departments of Pediatric Surgery and Neonatology¹, Zekai Tahir Burak Maternity Teaching Hospital, Ankara Turkey.

DEAR SIR

An omphalocele is one of the developmental anomalies of the abdominal wall. Incidence is 1.5-3 case per 10000 births. The abdominal viscera are surrounded by the Wharton jelly, peritoneum and amnion and contained in a translucent sac. The sac protrudes in the mid-line, through the umbilicus. Omphalocele is associated with additional anomalies in about 50-70% of cases. After the birth, defect is treated according to the defect size and the surgeon's preference [1-3].

A female infant of 36-week-gestation (weight 2420 g) was born by elective C-section to a 27-year-old gravida 1 mother. APGAR scores were 7 and 9 at first and fifth minutes, respectively. General physical examination showed an omphalocele sac approximately 5x5cm in size containing intestinal loops (Fig. 1), other systemic and cardiac assessments were normal. Sac was wrapped with a sterile wet gauze pad. The patient underwent orogastric decompression. At the postnatal fourth hour, a standing abdominal X-ray was taken, that was non suggestive. With 1 ml/min of oxygen support, we covered the operative area under the terms of surgical sterilization procedures at the bedside. The mid-gut in the omphalocele sac was pushed into the abdomen easily. During the repair process patient's respiratory and cardiac data were monitored. When intestine was reduced, prilocaine 0.5 ml was injected to the junction line of omphalocele sac and skin. An incision was given at the junction line with sac and skin. After removal of the sac, the skin was repaired with a continuous 4-0 polyglactin suture, keeping the fascia intact (Fig. 2). Incision was closed with wound dressing. The process

took about 5 minutes. Oral feeding was commenced 2 hours after the operation. The patient was discharged from hospital at 5th postoperative day. Patient is on follow up.



Figure 1: Omphalocele sac.



Figure 2: After bedside closure.

Omphalocele which is less than 4 cm in size is suitable for primary repair; whereas, defects over 5 cm are likely to contain liver and thus intra-abdominal volume may be insufficient after reduction of the intestines to the abdomen [4,5]. Compartment syndrome due to increased intra-abdominal pressure is the most serious

* Corresponding Author

gastroschisis



ELSEVIER

Journal of Pediatric Surgery

Volume 41, Issue 11, November 2006, Pages 1830-1835



Original article

Experience of bedside preformed silo staged reduction and closure for gastroschisis

Anthony Owen  , Sean Marven, Laura Jackson, Brice Antao, [Julian Roberts](#), Jenny Walker, Rang Shawis

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<https://doi.org/10.1016/j.jpedsurg.2006.06.048>

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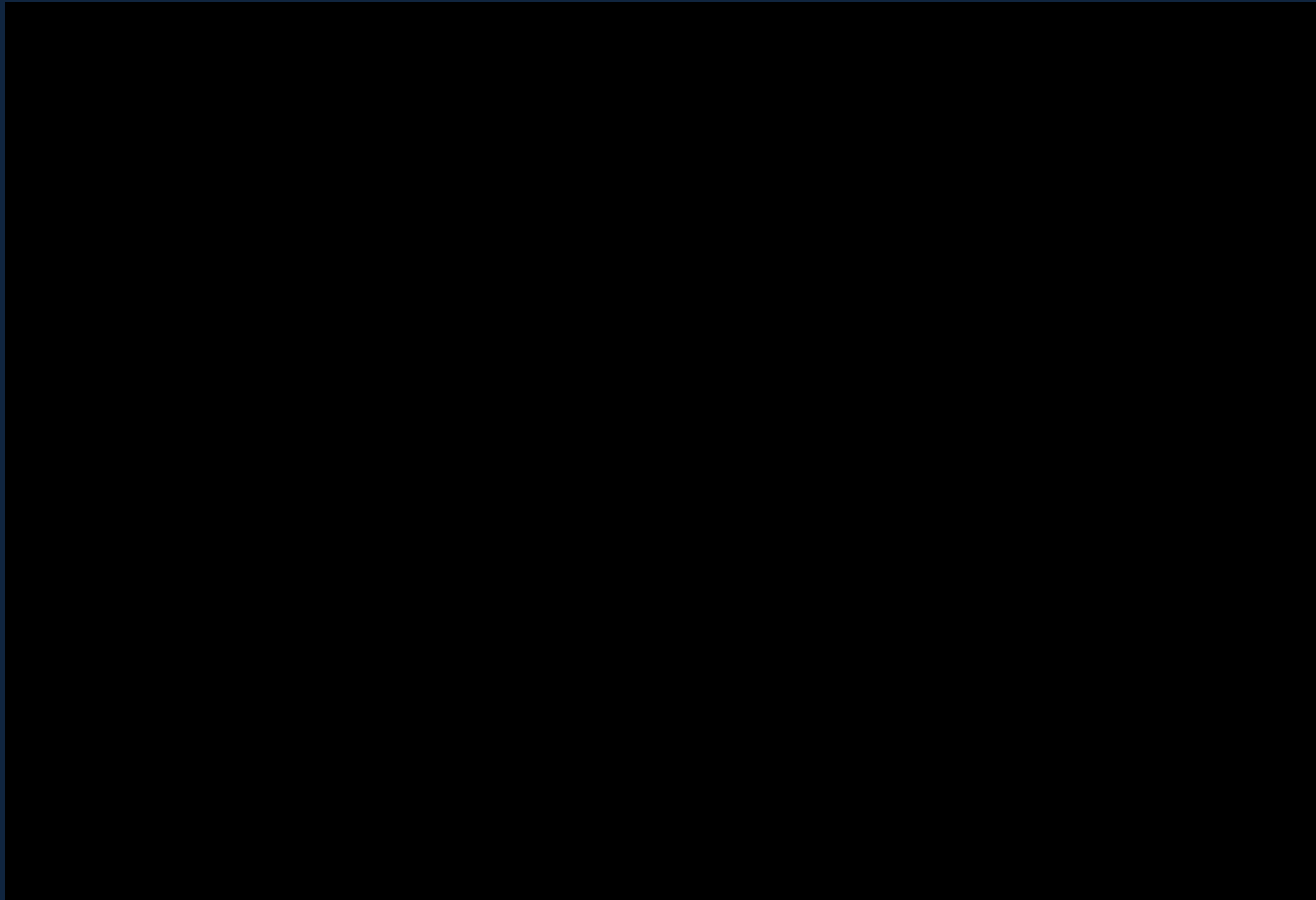
Abstract

Aim

The purpose of this study was to assess the effectiveness of routine staged reduction and closure at the bedside, using preformed silos with no **general anesthesia** (PSnoGA), compared to emergency operative fascial closure (OFC) under general anesthesia for **gastroschisis** (GS).



Silo reduction





Contents lists available at ScienceDirect

The American Journal of Surgery

journal homepage: www.americanjournalofsurgery.com



Outcomes of bedside sutureless umbilical closure without endotracheal intubation for gastroschisis repair in surgical infants



Gillian E. Pet, MD ^a, Rebecca A. Stark, MD ^b, John J. Meehan, MD ^c, Patrick J. Javid, MD ^{c,*}

^a Department of Pediatrics, University of Washington, School of Medicine, Seattle Children's Hospital, Seattle, WA, USA

^b Department of Surgery, University of California-Davis, Davis, CA, USA

^c Division of Pediatric General and Thoracic Surgery, University of Washington, School of Medicine, Seattle Children's Hospital, Seattle, WA, USA

ARTICLE INFO

Article history:

Received 21 December 2016

Received in revised form

24 January 2017

Accepted 16 March 2017

ABSTRACT

Introduction: Newborns with gastroschisis have historically undergone surgical repair under general anesthesia. Our institution recently transitioned to the sutureless umbilical closure for gastroschisis. We sought to evaluate the feasibility of bedside gastroschisis repair without endotracheal intubation.

Methods: A retrospective review was performed of neonates with gastroschisis who underwent sutureless umbilical closure from 2011 to 2015. Clinical characteristics and outcomes between groups were compared.

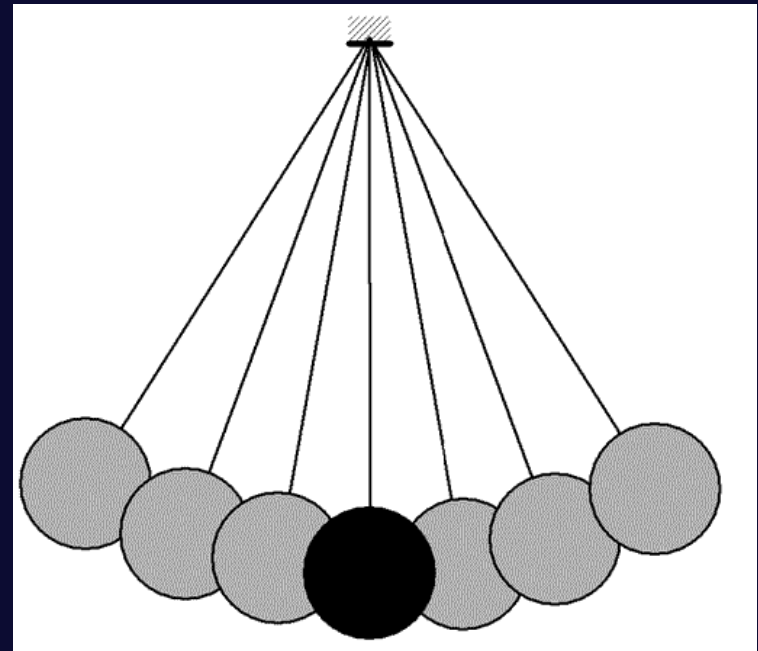
Results: In total, 53 infants underwent sutureless umbilical closure. Closure without endotracheal intubation was attempted in 23 (43%) babies and was successful in 15 (65%) infants. Two of the 8 patients who required intubation needed a temporary silo. Neonates successfully repaired without intubation were more premature ($p < 0.01$), smaller at birth ($p = 0.01$), and repaired nearly an hour sooner ($p < 0.01$). There were no differences in time to full enteral nutrition, length of stay, bowel ischemia, or sepsis.

Conclusion: Bedside sutureless umbilical closure without intubation is feasible and effective in newborns with gastroschisis. The procedure decreases time to gastroschisis closure. Smaller and more premature neonates were more likely to be successfully closed without intubation.

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Evolving Management of Gastroschis



Primary Repair vs. Routine Silo

All patient received silo with routine paralysis, intubation, and ventilation for placement.

Slow reductions.

Delayed elective surgical closure.

Prolonged antibiotic administration.

Prolonged opioid course (some patients discharged home on methadone)

1. Position and Cover

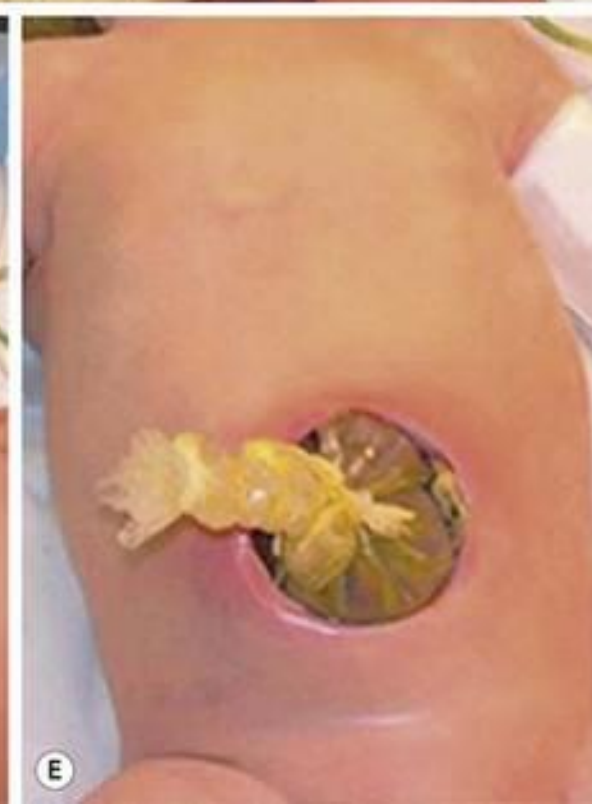


2. Neonatal Preparation



3. Decompression





Bedside Skin Closure Technique

PRESERVE UMBILICUS!

“Umbilical Flap” “Ward” “Plastic” “Sutureless”

↓General Anesthesia, ↓Abdominal Pressure, ↓Pain, ↑Cosmesis



- Everything at bedside
- No narcotics
- No intubation
- Just sweeties
- No sutures

- No operating room needed

Sutureless vs Sutured Gastroschisis Closure: A Prospective Randomized Controlled Trial.

Bruzoni M¹, Jaramillo JD², Dunlap JL², Abrajano C¹, Stack SW², Hintz SR³, Hernandez-Boussard T², Dutta S⁴.

Author information

Abstract

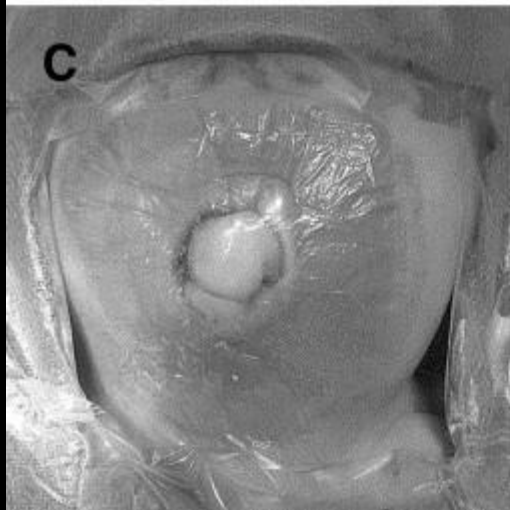
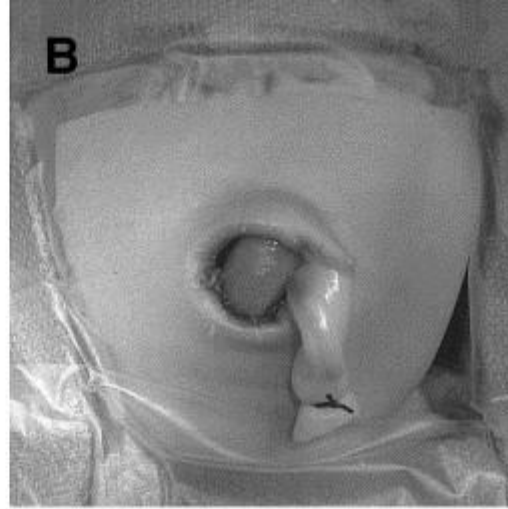
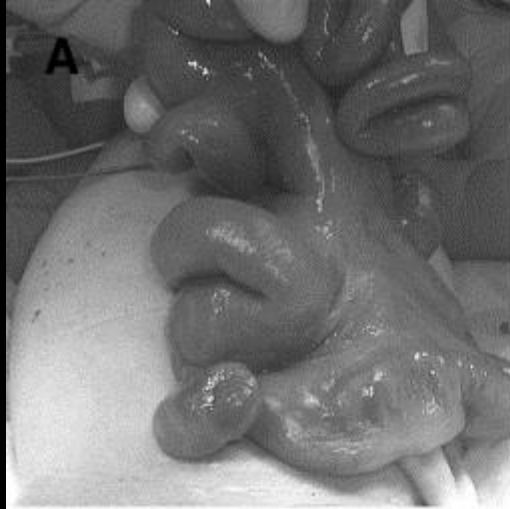
BACKGROUND: Sutureless gastroschisis repair involves covering the abdominal wall defect with the umbilical cord or a synthetic dressing to allow closure by secondary intention. No randomized studies have described the outcomes of this technique. Our objective was to prospectively compare short-term outcomes of sutureless vs sutured closure in a randomized fashion.

STUDY DESIGN: We recruited patients who presented with gastroschisis between 2009 and 2014 and were randomized into either sutureless or sutured treatment groups. Patients with complicated gastroschisis (stricture, perforation, and ischemia) were excluded. Predefined ventilation, feeding, and dressing change protocols were instituted. Primary outcomes were time to extubation and time to full feeds. Secondary outcomes included time to discharge and rate of complications. Data were analyzed using Fisher's exact or t-tests using a p value ≤ 0.05 . Factors associated with increased time to discharge were estimated using multivariate analyses.

RESULTS: Thirty-nine patients were enrolled, 19 to sutureless and 20 to sutured repair. There was no statistical difference in time to extubation (sutureless 1.89 vs sutured 3.15 days; p = 0.061). The sutureless group had a significant increase in mean time to full feeds (45.1 vs 27.8 days; p = 0.031) and mean time to discharge (49.3 vs 31.4 days; p = 0.016). Complication rates were similar in both groups. Multivariate regression modeling showed that an increase in time to discharge was independently associated with sutureless repair, feeding complications, and sepsis.

CONCLUSIONS: Sutureless repair of uncomplicated gastroschisis can be performed safely, however, it is associated with a significant increase in time to full feeds and time to discharge.

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A Initial presentation



B Abdomen after silastic silo



C Umbilical stalk



D Covered umbilical remnant



Evaluation of Clinical Outcomes of Sutureless vs Sutured Closure Techniques in Gastroschisis Repair.

Witt RG¹, Zobel M¹, Padilla B¹, Lee H¹, MacKenzie TC¹, Vu L¹.

Author information

Abstract

IMPORTANCE: Sutureless gastroschisis repair offers an alternative to the traditional sutured method and has been associated with decreased intubation time. Published study results are inconsistent regarding the advantages of sutureless closure.

OBJECTIVE: To compare the clinical outcomes of sutureless and sutured gastroschisis repair.

DESIGN, SETTING, AND PARTICIPANTS: A single-center cohort review was performed of all consecutive patients (n = 97) who underwent gastroschisis repair from February 1, 2007, to April 30, 2017, at the University of California, San Francisco. Patients' medical records were evaluated for clinical characteristics and outcomes. Cases with incomplete data during initial hospitalization were excluded.

MAIN OUTCOMES AND MEASURES: Length of hospital stay, time to full enteral feeds, total parenteral nutrition duration, days requiring intravenous analgesia, days intubated, wound infection rate, antibiotic treatment duration, rate of umbilical hernias that required an operation, and readmission rate.

RESULTS: In total, 97 patients (47 [48%] were female and 50 [52%] were male with a mean [SD] age of 2.8 [2.8] days) underwent gastroschisis repair, of which 7 were excluded for incomplete medical record. Of the 90 patients included in the study, 50 (56%) underwent sutured closure and 40 (44%) underwent sutureless closure. No statistical difference was found between the sutured and sutureless groups in length of hospital stay (mean [SD] days, 43.9 [40.4] vs 36.7 [21.2]; P = .71), time to full enteral feeds (mean [SD] days, 31.4 [20.2] vs 27.9 [17.3]; P = .22), total parenteral nutrition duration (mean [SD] days, 33.5 [29.8] vs 27.4 [18.2]; P = .23), wound infection rates (14 [28%] vs 10 [25%]; P = .81), and readmission rates (5 [10%] vs 7 [18%]; P = .36). The sutureless group, compared with the sutured group, had substantially fewer days receiving antibiotics (mean [SD], 7.2 [6.4] vs 12.4 [13.2]; P = .003), fewer days intubated (mean [SD], 2.8 [3.3] vs 6.8 [1.3]; P = .001), fewer days receiving intravenous analgesia (mean [SD], 4.2 [4.0] vs 7.1 [4.5]; P = .003), and fewer patients that required silo reduction (25 [63%] vs 48 [96%]; P < .001). Sutureless closures, compared with the sutured technique, had considerably more umbilical hernias requiring surgical repair (5 [13%] vs 0; P = .02).

CONCLUSIONS AND RELEVANCE: Sutureless repair of gastroschisis appears to be associated with a statistically significant reduction in mechanical ventilation duration and pain medication requirements but may increase umbilical hernia risk. Multicenter randomized clinical trials are necessary to determine the true advantages of the sutureless approach.

CONCLUSION

- Neonatal surgery in NICU is a safe procedure and can be utilized in unstable or ventilated neonate
- Every neonatal ICU planner should always create infrastructure for surgery in NICU
- Surgical NICU operative team should be developed for optimal reach and utilization of resources

