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Type IIIb jejunal atresia: the experience of two training hospitals in Johannesburg

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Type IIIb Jejunal Atresia: The Experience of Two Training Hospitals in Johannesburg

Dr Shalin Singh

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MMed in Paediatric Surgery

2019

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Declaration

I declare that this research is my own work. It is being submitted to the University of the Witwatersrand, in fulfilment of the requirements for the degree of MMed in the branch of Paediatric Surgery. This research report is being submitted by published paper.

It has not been previously submitted for any other degree or examination at this or any other university. This report does not utilize any previous or current work produced by another individual.



21 May 2019

Shalin Singh Date

Acknowledgements

Thank you to Prof Loveland for providing the time, space and encouragement to complete this task.

Thank you to Tarryn for being my person, my idea bouncer, my cheerleader and my courage every step of the way.

Thank you to my mom for unwavering and unlimited support, love and prayers.

This is dedicated to Bella. Her 15 years of loyalty along this journey will never be forgotten.

Presentation

SAAPS September 2016, Durban

Abstract

Introduction

Type IIIb jejunal atresia is reported to be the least common of all the small bowel atresias. It is also reported to have the worst prognosis of all types of jejunal atresia. This is because babies are born preterm or small for gestational age, with congenitally foreshortened bowel, and a single artery to perfuse the distal small bowel, this in a retrograde fashion. The current theory for gap and cord type atresias does not result in apple peel atresias in experimental models. This will be the largest published series of Type IIIb atresias to date.

Aims

To report the incidence of Type IIIb jejunal atresia at the two academic hospitals in Johannesburg and to look for statistically significant similarities in the cohort of jejunoileal atresias.

Objectives

To collect data from the paediatric surgery database and patient files.
To work with the collected data, if patient similarities are found, and apply statistical analysis with the help of a statistician.

Methods

We performed a retrospective chart review of all patients with a confirmed diagnosis of jejunoileal atresia admitted to the Department of Paediatric Surgery over 59 months.

Results

We operated on 113 cases of jejunoileal atresia. 17 patients were excluded. 96 patients were collected. Type IIIb jejunal atresia made up 32% (n=31) of the study group. 39% of those (n=12) had multiple atresias. Perforation and volvulus were found in 6% and 16% of the patients respectively. All patients with volvulus were found to have necrosis of the entire midgut and required palliative care. When comparing the apple peel atresias to the cord and gap types, there was no significant difference in the prevalence of multiple atresias (p=0.18), the prevalence of perforation (p=0.26) or the time to full feeds (p=0.10)

Conclusion

Type IIIb atresia is not rare in our environment. Volvulus is significantly more common in Type IIIb atresia and carries a 100% mortality rate.

1. Introduction

Intestinal atresia is a well-recognised cause of bowel obstruction in the neonate. Grosfeld classified jejunoileal atresia into 5 types (Figure 1). [1] Type I is an intraluminal septum with no mesenteric defect. A cord joins the atretic ends of Type II with no mesenteric defect. Type IIIa involves two blind ending segments with a V shaped mesenteric defect between them. Type IV comprises multiple atresias in a "string of sausages" configuration. Type IIIb (also called the "apple peel", "Christmas tree" or "maypole" type) consists of a proximal jejunal atresia with absent mesentery and a varying length of ileum wrapped around its retrograde arterial supply from either the right colic or ileocolic artery.

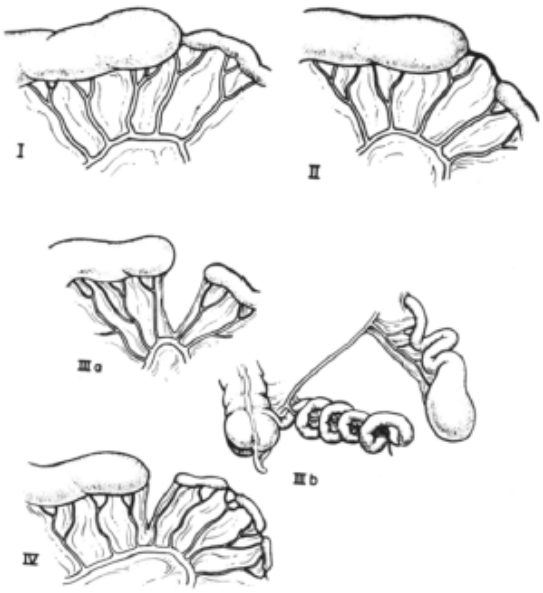


Fig. 2. Suggested classification of jejunoileal atresia: Type I—mucosal, Type II—atretic ends separated by fibrous cord, Type IIIa—atretic ends separated by V-shaped mesenteric gap, Type IIIb—"apple peel" atresia, Type IV—multiple atresias.

Figure 1[1]

Our current understanding of the aetiology and embryology of jejunoileal atresia is based on the landmark work by Jannie Louw and Chris Barnard published in the Lancet on 19 November 1955.[3] Their experimental animal study confirmed that at least some intestinal atresias are caused by a "vascular accident" whereby the integrity of the intestinal blood supply is compromised. This leads to infarction of a segment of foetal bowel and subsequent atrophy and absorption of the affected segment. The cause of the "vascular accident" is not completely understood. Intestinal atresias have also been associated with intestinal volvulus, intussusception, internal hernia, intrauterine death of one monochorionic twin with placental vascular communications and strangulation in a tight gastroschisis or omphalocoele defect, further reinforcing Louw and Barnard's theory for gap and cord type atresias.[4-6] In addition, familial instances of jejunoileal atresias have been observed, suggesting a genetic component to the aetiology.[7] An ischaemic aetiology would also explain the association with maternal smoking and vasoconstrictor drug exposure during pregnancy.[2] However, the configuration of an apple peel atresia suggests that it is unlikely to be caused by such local mechanical obstruction and the mechanism is thought to be different. This type is considered to be the result of occlusion of the superior mesenteric artery, distal to the origin of the right colic or ileo-colic artery early on in gestation. Ischaemic necrosis of the distal SMA and mesentery follows. The intestine would elongate faster than its artery, resulting in a helical configuration of the ileum. We assume that SMA occlusion must take place after 10 weeks of gestation when the entire bowel has returned to the abdomen from the yolk sack because Type IIIb jejunal atresia has never been

documented to occur with gastroschisis or omphalocoele. The pathogenesis of the occlusion remains unknown. More research with larger series of cases is required.

Children with jejunoileal atresia are rarely found to have congenital abnormalities outside of the gastrointestinal tract. They are otherwise healthy and sometimes premature or small for gestational age babies with a good prognosis.[4 8] The apple peel type atresias are plagued by the most postoperative complications. Their anastomoses have a very tenuous blood supply because it is in a retrograde fashion from a single artery. They are thus more prone to anastomotic strictures, leaks and breakdowns. They have a prolonged ileus and the longest time to feed, which make them dependent on parenteral nutrition with its complications of cholestatic jaundice and central line sepsis. Their small bowel is also congenitally foreshortened and places them at risk for short bowel syndrome. This, combined with their prematurity, places them at highest risk and worsens their prognosis considerably.[9] They are also disadvantaged by the fact that there is very little, if any, antenatal diagnosis in Africa.[2] They are diagnosed late, reach definitive medical care several days after that and arrive in severe metabolic acidosis with marked electrolyte abnormalities, aspiration pneumonia and are prone to volvulus and necrosis of their bowel.

The treatment of jejunoileal atresia is always surgical with excision of the atretic segments and primary anastomosis. The preparation of the dilated proximal segment is however not agreed upon. It has been found that there is

smooth muscle hypertrophy, hyperplasia and a paucity of ganglion cells in this segment. The increased diameter causes a decrease in intraluminal pressure on the basis of Laplace's Law. In other words, the pressure created is inversely proportional to the radius.[10] This then leads to impaired peristalsis and lengthens the time to full feeds. There are different ways of addressing this problem. The proximal segment can be resected up to the ligament of Treitz and then anastomosed to the spatulated distal segment. One centre excises a disc of tissue the same size as the distal bowel from the end of its bulbous segment, imbricates the proximal segment and then anastomoses end-to-end. Still others do a stapled tapering enteroplasty and end-to-end anastomosis as we do.[4,9,10] An often hotly debated topic is whether or not to untwist the small bowel around its artery. Some surgeons will leave the bowel twisted as long as it looks well vascularised and perform the anastomosis. This makes closing the mesenteric defect impossible and other opinion is that leaving bowel twisted is counterintuitive and it must be untwisted. There is no documented information in the English language literature about whether or not to untwist the bowel before performing the anastomosis.

The reported incidence of jejunoileal atresia varies from 1.8 per 10 000 live births in the United Kingdom[8], 1 in 5000 live births in the Netherlands[11], 1 in 3000 live births in the United States to less than 1 in 1000 in Africa.[2] Apple peel atresia is reported to be the rarest type in the spectrum. There are 155 reported cases of Type IIIb jejunal atresia in the English-language literature from 1961 to 2002 and only six more have been reported since then.[7,11-16]

The published incidence varies from 5 to 10% in the United Kingdom, America, Japan and the Netherlands with small series of between four and nine patients reported over periods of between 17 and 30 years.[4,9,6,8,11] In Africa the incidence is reported at 19% of all small bowel atresias and there is no published African series.[2]

The incidence of Type IIIb jejunal atresia in Johannesburg is remarkably higher. We have collected the largest series of apple peel atresias in the world.

2. Methods

2.1 Study Aim

- To report the number of Type IIIb jejunal atresias treated in Johannesburg.
- To look for statistically significant similarities in our patients.
- To document our intraoperative management

2.2 Study Objectives

Collect data from the Paediatric Surgery database and patient files.

Work with a statistician to determine statistical significance of similarities found.

Make this information available to others as a starting block for identifying the cause of this atresia.

2.3 Study Area

Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) is situated in Parktown, Johannesburg and serves a low-income population of approximately 1 million children under the age of 15 years [19]

Chris Hani Baragwanath Academic Hospital (CHBAH) is situated in Soweto, Johannesburg and serves a low-income population of approximately 2.5 million children under the age of 15 years from as far away as Klerksdorp and Mafikeng in the neighbouring North West Province. It is the third largest hospital in the world and the largest hospital in the southern hemisphere.

These two hospitals serve as the only government-funded access to paediatric surgical care in Johannesburg. The two units run 112 beds, seven outpatient clinics and 15 theatre lists per week with access to 39 shared ICU beds and a staff complement of eight consultant paediatric surgeons, seven trainees, one supernumerary trainee and ten medical officers and rotating general surgery trainees.

2.4 Study Design

A retrospective chart and database review of all patients operated on for jejunoileal atresia at Chris Hani Baragwanath Academic Hospital and Charlotte Maxeke Johannesburg Academic Hospital between 01 January 2010 and 25 November 2015 was performed.

2.5 Inclusion Criteria

All patients with a diagnosis of jejunoileal atresia were considered for inclusion in the study.

2.6 Exclusion Criteria

Patients who had pre-operative signs, symptoms and investigations suggestive of atresia but intra-operative findings of another diagnosis i.e. malrotation, duodenal atresia, jejunoileal stenosis, colonic or rectal atresias were excluded. Patients with insufficient records were also excluded.

2.7 Data Collection

The Department of Paediatric Surgery's database was searched using the ICD 10 codes for small bowel atresia (Q41.1 – Q41.9). These patients were captured on a spreadsheet, identified only with their newly allocated study numbers. The operation notes, discharge summaries and face sheets of all jejunoileal atresias were reviewed and the following pertinent information was captured on a spreadsheet.

- Gestational age
- Sex
- Age at referral to our centres
- Age at surgery
- Referral hospital
- Findings at operation
  - type
  - other abnormalities
  - perforation
  - volvulus
- Operative procedure
  - bowel untwisted or not
  - tapered or resected or imbricated
- Length of hospital stay
- Sepsis (if any)
- Source of sepsis (if known)
- Outcome – discharge or death
- Special notes

Where this information was not available on the database, the hospital file was requested via our clerks. Lost files necessitated exclusion from the study.

2.8 Statistical Analysis

Descriptive analysis of the data was carried out as follows: Categorical variables were summarised by frequency and percentage tabulation and illustrated by means of bar charts. Continuous variables were summarised by the mean, standard deviation, median and interquartile range, and their distribution illustrated by means of histograms.

The X^2 test was used to assess the relationships between categorical variables and JA group. Fisher's exact test was used for 2 x 2 tables or where the requirements for the X^2 test could not be met. The strength of the associations was measured by Cramer's V and the phi coefficient respectively. The following scale of interpretation was used:

0.50 and above	high/strong association
0.30 to 0.49	moderate association
0.10 to 0.29	weak association
below 0.10	little if any association

The relationship between age at operation and JA group was assessed by the unpaired t-test. Where the data did not meet the assumptions of the test, a non-parametric alternative, the Wilcoxon rank sum test was used. The strength of the associations was measured by the Cohen's d for parametric

tests and the r-value for the non-parametric tests. The following scale of interpretation was used:

0.80 and above	large effect
0.50 to 0.79	moderate effect
0.20 to 0.49	small effect
below 0.20	near zero effect

Data analysis was carried out using SAS version 9.4 for Windows. The 5% significance level was used. In other words, p-values <0.05 indicate significant results.

Statistical analysis was outsourced to Dr Petra Gaylard.

2.9 Ethics Approval

Ethical approval was obtained from the Human Research Ethics Committee of the University of the Witwatersrand (clearance certificate number M151132). All study participants were given a study number to protect anonymity of the data.

3. Results

3.1 Small Bowel Atresias

We operated on 113 cases of jejunoileal atresia. All cases were performed open via laparotomy. 17 patients were excluded due to missing files and inadequate information. 96 patients were collected. Type IIIb jejunal atresia made up 33% (n=32) of the study group. 34% were type I, 21% were type IV, 7% were type II and 5% were type IIIa. Figure 2

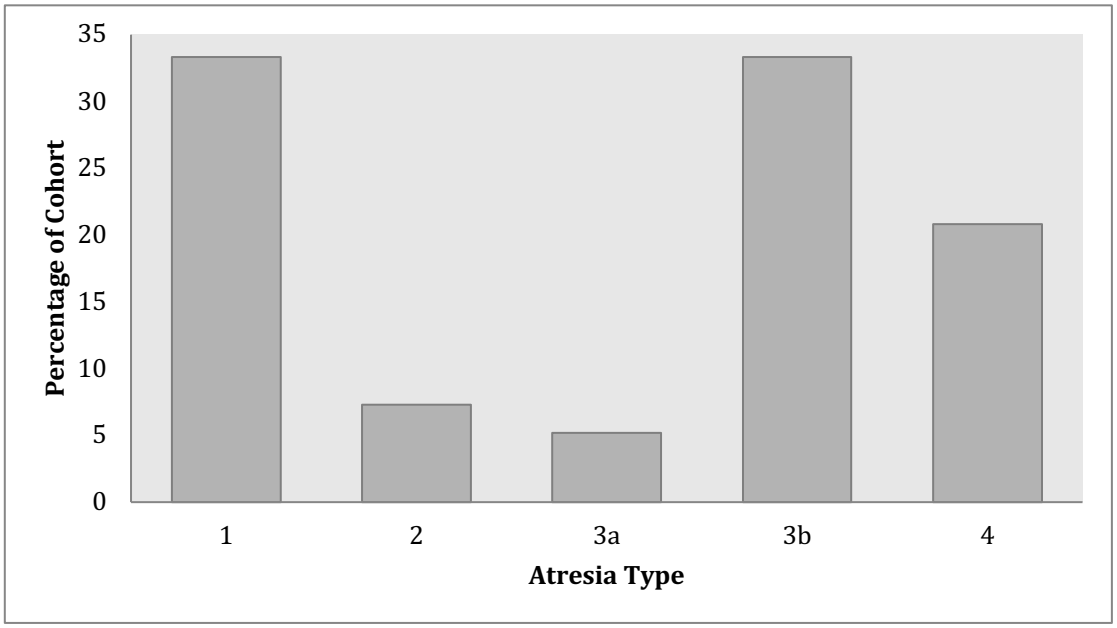


Figure 2

52% were female. The male/female ratio was 0.92. Age at referral ranged between 1 day of life and 35 days of life. Age at surgery ranged between 1 day of life and 38 days of life with a mean age of 7 days and a median age of 5 days. The maximum waiting time from referral to surgery was 5 days. Most patients had their atresias repaired on the day of referral or the day after arrival in our unit. The delay to surgery was either due to a lack of ICU beds or the fact that the child was unfit for theatre. One patient presented with

severe sepsis and haemorrhagic disease of the newborn. Three others presented with acute kidney injury, hypochloraemia and hyponatraemia, which were all safely corrected before surgery. The gestational age was not recorded in 14 of the patients' files. The recorded gestational ages ranged from 30 to 38 weeks. The referral hospitals were Bheki Mlangeni District Hospital, Mafikeng Provincial Hospital, Klerksdorp Hospital, Yeoville Clinic, Far East Rand Hospital, Rahima Moosa Mother and Child Hospital, Tambo Memorial Hospital, South Rand Hospital, Thembisa Hospital, Sebokeng Hospital, Leratong Hospital and our own inborn babies. The referrals were of almost equal distribution. 12.5% (n=12) of our jejunoileal atresias had associated abnormalities. 7 babies had associated malrotation; four type IV, two type IIIa and one type II. One type I had a cardiac abnormality documented as a small atrioseptal defect not requiring any surgical management or medical antifailure therapy. One type II patient also had an imperforate anus. One type I patient had a club foot. One type I patient was associated with a duplication cyst and a volvulus. One type IV patient had amniotic bands on the lower limbs requiring plastic surgery. Three patients presented with a perforation. Two of these were type IIIb with a volvulus and one was a type II with no volvulus. 12 type IIIb patients also had associated other atresias. Surgical technique was not documented in 5 patient files. All the other type IIIb atresias (n=27) were untwisted and had their mesenteric defects closed. 55 patients had the proximal limb of their atresia tapered with a stapler and over sewed. 12 patients underwent hand tapering because there was no stapler available. No surgeon chose to imbricate the proximal limb and 19 patients had resections of the dilated proximal limb before

anastomosis. There were between 1 and 3 anastomoses done per child. The child with the associated anorectal malformation had an ileostomy fashioned with resection of the type IV ileal atresias as his initial operation. This was then followed with a PSARP and closure of the ileostomy with spatulation of the colon and no tapering. One patient with type I atresia was clipped and dropped at initial operation on day 4 of life for a volvulus with necrotic bowel and no perforation. Length of hospital stay was unknown in 63 patients. The available data allowed measurement of time to full bolus feeds instead and shows a range from 4 to 75 days with a mean of 27.6 days and a median of 22 days (p=0.26). 18 babies died during their primary admission under our care. 9 of those babies underwent palliation because of inadequate bowel length found at laparotomy. Our patients' economic and social circumstances do not allow for home TPN and thus palliation is chosen for patients with bowel length of less than 17cm. 5 babies had an unknown post-operative course due to inadequate documentation or lost files. Of the 9 babies who underwent palliation there were 4 type IV, 1 type IIIa and 4 type IIIb atresias. One type IV had 17cm of small bowel, one had 10 atresias with 15cm of small bowel and two had 10cm of small bowel. The type IIIa had 12cm of small bowel. The type IIIb's were noted to have all necrotic bowel, 10cm of small bowel, no bowel just stomach remaining and no small bowel respectively. The other 9 deaths were due to sepsis. Only one of those was a type IIIb. Three babies died of a ventilator associated pneumonia with Acinetobacter Baumanii or Klebsiella Pneumonia cultured on tracheal aspirates. Five babies succumbed to fungal sepsis, one cultured Streptococcus Viridans and patient with type IV atresia who presented with a pneumoperitoneum and septic

shock, had a pencil drain inserted and then had a laparotomy for a clip, resect and drop procedure. The child remained in septic shock, dependent on a high frequency oscillatory ventilator and demised before the relook operation. Documented complications include two anastomotic strictures in a type IV and a type II. Both were relooked and had their anastomoses resected and reanastomosed. One sheath dehisced in a type IIIa with no anastomotic leak or other intra-abdominal complication found on relook. There was one anastomotic leak in a type IIIb. This was diagnosed on an abdominal x-ray done for sudden abdominal distension. The x-ray revealed a pneumoperitoneum. At the relook operation the anastomosis was excised and redone. The child was discharged home after 62 days in the hospital on day 63 of life.

3.2 Type IIIb Jejunal Atresias

34% of the type IIIb atresias were male. The male/female ratio was 0.52. 47% (n=15) had multiple atresias. Median age at operation was 6 days (interquartile range 3-9 days; range 1-24 days). Perforation and volvulus were found in 6% of the jejunoileal atresias and 28% of the type IIIb patients. When comparing the apple peel atresias to the cord and gap types, there was no significant difference in the prevalence of multiple atresias (p=0.18) or the prevalence of perforation (p=0.26). Patients were discharged from the paediatric surgery service once they were on full bolus feeds. Some were discharged into the care of the paediatric service in our hospital and remained in the hospital, others were transferred back to their base hospital and some were sent home from our paediatric surgery ward. The type IIIb patients' time

to full feeds ranged between 12 and 62 days with a mean of 34.8 days and a median of 35 days (p=0.26). There is no long-term follow up in the in-patient files and no documentation of where the children were discharged to after they were placed back into the care of the referring paediatricians. We are also not informed and have no documentation of the patients who died whilst under the care of the paediatric service.

4. Discussion

Record keeping in our hospitals is poor as the hospital is not fully digital and records are lost. We have improved it with our own departmental database, which was implemented in 2010, but there is still progress to be made. A prospective study is needed to minimise this problem.

Despite this, we have collected the largest series of type IIIb jejunal atresias ever published in the English literature and found that type IIIb atresia isn't as rare in our environment as it is reported to be in the rest of the world. It is, in fact, the second commonest type of atresia found in our population, closely following our numbers of type I atresias. We looked for statistically significant similarities in these patients to identify an aetiology of this poorly understood congenital abnormality, but none were found.

Delay in diagnosis is as much of a problem as is reported in other African countries.[17,18]. Ileal atresias were referred later than the more proximal diagnoses. One child was admitted to a referral hospital multiple times with a diagnosis of acute gastroenteritis and failure to thrive, despite continuous bile stained aspirates. The diagnosis was eventually made on day 37 of life.

We are operating on the referred babies within acceptable time periods and have excellent post-operative support from our neonatal intensive care colleagues. We also have good access to parenteral nutrition and a network of outstanding dieticians, physiotherapists, speech therapists and

occupational therapists. Almost no antenatal diagnoses are made as late term ultrasounds are not routinely performed.

There was no gender preponderance found, which is in line with international data.

There was also no geographical nidus identified. This infers that there is no environmental aetiological factor at play.

Associated anomalies were indeed uncommon, but not rare, in the gap and cord type jejunoileal atresias. No associated abnormalities were found in the Type IIIb group. This also points towards an alternative aetiology for this type. Volvulus and perforation were more common with Type IIIb atresia, as is expected due to the abnormal anatomy of the bowel.

Gestational age was slightly premature with no significant difference found between the two groups of babies.

Surgical technique was standardized. The bowel was untwisted, and the mesenteric gap closed, with good short-term outcomes. Proximal tapering with end-to-end anastomosis is an easily reproducible operation with a low complication rate in our hands.

Length of hospital stay was difficult to measure. We instead measured the time to full bolus feeds. Patients with type IIIb jejunal atresia took 20% longer

to reach full bolus feeds, which is as expected in patients with foreshortened bowel or gastrointestinal compromise.

Short-term follow up showed good results for the type IIIb patients with salvageable amounts of small bowel. There was a 3% mortality rate in this group. The gap and cord type atresia group had a lower (7.8%) palliation rate but higher mortality rate (12.5%). Children with less than 17cm of bowel necessitate palliation in our environment. There is no access to home TPN, our patients come from poor social and economic circumstances without running water, electricity or transport. No deaths were due to surgical complications. All the babies who died were septic from an extra-abdominal source. They succumbed to nosocomial infection, catheter related bloodstream infections and ventilator associated pneumonia.

Our short-term complication rate was low with 2% stricture rate in the gap and cord types and one anastomotic leak (3% complication rate) in a type IIIb patient.

No long-term data is available for this patient group. A prospective study is necessary to determine the exact pathophysiology of this atresia type.

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19. Census 2015

Appendix A – Ethics Approval

R14/49 Dr Shalin Singh

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M151132

NAME: (Principal Investigator)	Dr Shalin Singh
DEPARTMENT:	Paediatric Surgery Chris Hani Baragwanath Academic Hospital and Charlotte Maxeke Johannesburg Academic Hospital
PROJECT TITLE:	Type IIIb Jejunal Atresia : The Johannesburg Experience
DATE CONSIDERED:	27/11/2015
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Jerome Loveland
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	18/01/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix B – Supervisor Declaration

02 June 2017

Attention: Faculty of Health Sciences, University of the Witwatersrand

Re:Type IIIb jejunal atresia: the experience of two training hospitals in Johannesburg

This letter serves to confirm that Shalin Singh is the primary author of the above-mentioned research. It has been submitted for publication in the Journal of Pediatric Surgery.

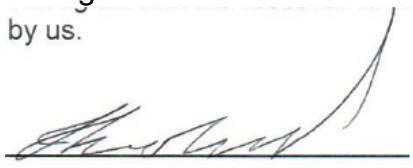
It is sufficient for consideration as a published paper towards the research component of her MMed degree at the University of Witwatersrand.

Her contribution towards the research was as follows:

- Protocol write-up, submission thereof and presentation to the Faculty of Health Sciences
- Ethics application
- Collection of data, entry into relevant collection databases and liaison with statistician for ultimate data analysis.
- Research write-up
- Formatting for submission to the journal
- Presentation at the South African Association of Paediatric Surgeon's national conference 2016.
- Communication with the journal editor and refining of review points

As supervisors of the research project, we reviewed the research at regular intervals, made changes to improve the write-up and verified the data analysis.

We agree that the research is the work of Shalin Singh, assisted and refined by us.



Prof J Loveland



Dr K Hoffman

Appendix C – Data Collection Form

Sex	Age at Operation (days)	Gestational Age (weeks)	Age at referral (days)	Born	Multiple atresias	Volvulus	Time to Full Feeds (days)	Outcome
M	12	37	10	Out	X	2	39	Discharged
F	3	35	3	Out	X	1	29	Discharged
M	24	30	19	Out	✓	2	50	Discharged
F	5	34	5	Out	X	2	30	Discharged
M	7	32	7	Out	✓	2	-	Palliated
F	9	37	7	Out	✓	2	33	Discharged
F	5	36	4	Out	X	1	-	Palliated
M	6	34	5	Out	X	1	-	Palliated
F	3	33	2	Out	X	1	-	Palliated
M	1	30	1	In	X	1	62	Discharged
F	3	35	3	Out	X	2	12	Discharged
M	9	37	6	Out	X	2	42	Discharged
M	1	38	1	Out	✓	2	21	Discharged
F	4	35	1	Out	X	1	35	Discharged
F	8	33	7	Out	✓	2	61	Discharged
M	5	37	5	Out	X	2	37	Discharged
M	7	36	6	Out	✓	2	30	Discharged
F	8	38	8	Out	X	2	29	Discharged
F	3	36	3	Out	X	1	32	Discharged
F	7	35	4	Out	X	2	30	Discharged
F	22	34	18	Out	✓	2	41	Discharged
F	3	33	2	Out	✓	2	15	Discharged
F	6	33	4	Out	X	2	25	Discharged
F	14	32	10	Out	✓	2	41	Discharged
F	8	31	5	Out	✓	2	19	Discharged
F	4	38	3	In	X	2	-	Palliated
F	24	37	24	Out	X	2	30	Discharged
F	1	36	1	In	X	1	-	Demised
F	16	35	10	Out	✓	2	34	Discharged
M	19	32	15	Out	✓	2	40	Discharged
F	3	37	2	Out	X	1	23	Discharged