ISSN 2515-8260 Volume 9, Issue 3, Winter 2022

Gastroschisis management and outcome in Guntur Medical College Hospital – A Retrospective study

Authors Details

1st andcorresponding author
Dr.ChandaBhaskara Rao, M. S,M.Ch,
Associate Professor,
Department of Paediatric Surgery,
Government General Hospital and Guntur Medical College,
Guntur, Andhra Pradesh, India.
Email id- cbraoyoga@gmail.com

2nd author
Dr.AralikattiHemavathiRevanappa, MBBS,(MD),
Medical Officer,
Department of Pediatric Surgery,
Government General Hospital,
Guntur, Andhra Pradesh, India.

3rd author
Dr. Chinmay Rao Chanda,(MBBS),
Junior Resident,
Department of Pediatric Surgery,
Government General Hospital and Guntur Medical College,
Guntur, Andhra Pradesh, India.

4th author
Dr.BhavanaChanda, MBBS,(M.D),
Postgraduate Resident,
Department of General Medicine,
Osmania General Hospital and Osmania Medical College,
Hyderabad, Telangana, India.

Type of article: ORIGINAL ARTICLE

ABSTRCT

BACKGROUND: Gastroschisisisacongenitalparamedian full-thickness abdominal wall fusion defectwithevisceration ofabdominalcontents, mostly contains small and large intestines without sac. Defect is usually to the right side of the umbilical cord. The bowel is non-rotated, without secondary fixation to the posterior abdominal wall. No genetic association reported

MATERIALS AND METHODS: During the studyperiod,ninety-sixpatients were treated; studied as two groups, Simple gastroschisis andcomplex gastroschisisdepending upon presence or absence of intestinal perforation, necrosis, stenosis, malrotation and volvulus and intestinal

atresia.Simple gastroschisiscases74(77.08%), complex gastroschisis cases 22 cases(22.91%) studied.Primary reduction ofeviscerated bowel and fascial layer closerof abdominal wallwas selected as initial surgical procedure in patients withstable general condition and smaller size of the eviscerated bowl masswhich can be accommodated in abdominal cavity.Primary surgical procedure done in 46 patients, Silo construction and later repair done in 28 patients in simple gastroschisisgroup.Complex gastroschisisgroup22 cases, (12 intestinal atresia cases, three perforations, necrosis of small bowl in three cases, volvulus with impending gangrene due tonarrow stalk with small defect in three cases,one patient total gangrene of midgut).

RESULTS: Total number of cases were 96 from 2015 to 2021. Simplegastroschisisgroup 46 primary surgical repairsand 28 silos,Complex gastroschisisgroup surgical repair in 11cases, remaining11cases both surgical and silo used. Silo was not used as exclusive method of managementin our institute due to local prevailing conditions.Simple gastrostomiesgroup 74 cases,46patients underwent primary surgical repair,41 patients (89.13%) survived, Five deaths(10.86%),28 patients underwentsilo construction,19 patients survived(67.85%),Nine deaths(32.14%).Over allsimplegastroschisisgroup 60 patients survived(81.08%),14 deaths(18.91%)recorded.Complex gastroschisis group22 patients,13(59.09%)patients survived,9 deaths(40.90%). Total patients survivedin both groups 73,out of 96 patients (76.04%)with overall deaths 23 (23.95%).

CONCLUSION: Retrospective study of gastroschisis patients admitted in our hospital from 2015to2021. Total number of patients were 96; Simple gastroschisis74 cases,46 primary surgical repairs 41 (89.13%) survived,28 silos with19 patients survived(67.85%).Complex gastroschisisgroup22 cases, 13(59.09%)patients survived.Total patients survived 73(76.04%)out of 96 patients with overall deaths 23 (23.95%).Most of the deaths occurreddue to sepsis and prematurity with low birth weight. With limited facilities, Simple gastroschisis group survival good 81.08%and overall survival rate of 76.04% couldbeachieved in the department.

KEYWORDS

Gastroschisis,Omphalocele,AbdominalWallDefect,silo

INTRODUCTION.

Gastroschisisisacongenitalparamedian full-thickness abdominal wall fusion defectwitheviscerationofabdominalcontents,mostly contains small and large intestines without sac. Defect is usually to the right side of the umbilical cord. (1)Theincidenceofgastroschisisisaround1.4per10,000pregnanciesandisrarelyassociatedwithothercongenitalabnormalities. The bowel is non-rotated, without secondary fixation to the posterior abdominal wall. No genetic association reported

Embryology gastroschisis -After fertilization, cell division produces a hollow sphere, divided by a bilaminar plate withepiblast and hypoblast, which are close to the amnion and yolk sac cavities

respectively. The hypoblast develops into the placenta,epiblast cells form the embryo. The bilaminar disc is divided axially by the primitive streak, apex of primitive streakis the primitive node .Primitive streak gives neural tube (central nervous system). Bilaminar disc becomes a disk with three germ cell layers to develop into para-axial (peripheral nervous system), intermediate (gonads and kidneys), and lateral mesoderm, which further divides into splanchnic (gastrointestinal [GI] tract along with endoderm) and somatic (body wall) with epiderm (2).

At sixth week, rapid increase in size of the liver and intestines, causes herniation of the midgut into the amniotic cavity. At 10th week, return of the midgut into abdomen due increase in sizeof cavity. Rotation and fixation of duodenum and ascending colon (the proximal and distal midgut) occurs upon their return. Ingrowth of mesoderm forms the urorectal septum and disintegration of cloacal membrane leads to urogenital andGI tracts outlets. Lateral folds, cephalic and caudal folds fused, causing constriction of the umbilical ring(3).Gastroschisis, may be caused by weakness in the body wall caused by failed ingrowth ofmesoderm, or impaired midline fusion.Folic acid deficiency, hypoxia, and salicylates may be factors. Elevation of maternal serum alpha-fetoprotein (MSAFP) is seen in omphalocele and gastroschisis. An elevated AFP warrants ultrasonographic examination.Polyhydramnios in gastroschisis indicates associated intestinal atresia. Antenatal detectedgastroschisis(4), delivery should be planned at tertiary care center. Gastroschisis mostly occurs lean, young and low socioeconomic women. Gastroschisis incidence is on increasing trend over the decades of study.Gastroschisis Classified into "simple" versus "complex" (macroscopic intestinal abnormalities) may be a reliable predictor of outcome. [5]

Sepsis the primary cause ofdeath in more than half of these patients. Pulmonary hypoplasia and respiratory failure are two important predictors of mortality. Hypothermia, Dehydration, Hypoglycemia, In utero growth restriction(IUGR). Oligohydramnios, Fetal distress and birth asphyxia, Injury to the intestines while delivery and transport along with prematurity and low birth weight also negatively influences outcome. Improvements in antibiotics respiratory care, total parenteral nutrition, transport, anesthesia and surgery increased the survival rates up to 90%. Long-term morbidity is related to pseudo- intestinal obstruction (intestinal dysmotility), short gut, malabsorption due to mucosal injury) and gastroesophageal reflux disease, poor wound closures, ventral hernias which may require surgical repair. Improvement in parenteral and enteral nutrition, new venous access devices, catheter sepsis prevention and early treatment, surgical innovativeprocedures, and aggressive management of bacterial overgrowth in stagnant loops of intestine improve the outcomes.

The verticaldefect is around3 to 5 cm in size with normal umbilicalattachment.Theare usually the only small and large bowl protruding outside the abdominal wall. The spleen and liverprotrude rarely. Othermajororgansystem malformationsofarerarelyseen withgastroschisis.Infarction oratresiaoftheherniatedbowel can be seen as complications.ProposedMechanismare1.omphalomesentericarteryblock inutero,2.Premature atrophy rightumbilical vein with mesenchymal

damage.3.Vascularinsultoftherightlateralfold.Potentialsuspected TeratogensAssociatedwithGastroschisisare1.Organicchemicals/solvents,2.Cyclo-oxygenaseinhibitors(Aspirin,ibuprofen),3.Decongestants,4.Acetaminophen,5.Oralcontraceptives,6.Maternalsmoking,7.Alcohol,8.Illicitdrugs,(e.g.cocaine,amphetamine),and9.X-rayirradiationinearlypregnancy.The abdominal wall is develops from the fusion four embryonic folds cephalic, caudal,right and left lateral folds of the mesoderm origin. GastroschisisisEmbryologic abnormal development ofthe abdominal wall. Thesefolds meet in the Centre of the embryo to form the abdominal wall and umbilicus. Each mesodermal folds create different part of the abdominal wall. The cephalic fold develops as the upper abdomen wall, the caudal fold develops as the lower abdomen wall and the lateral folds transform into both sides of the abdominal wall.Gastroschisiscan be diagnosed antenatally as early as 12 to 16 weeks of gestation.Gastroschisis is aabdominal wall defect lateral to the umbilical cord, whereas omphalocele is a defect in theumbilicus which the intestines are enclosed within the umbilical cord coverings. Umbilical cord is normal in Gastroschisis.Two defects must bedifferentiated(6)because there is a higher incidence of major congenital/chromosomal anomalies associated with Omphalocele.Chromosomal anomalies(7)very rare(less than1%) in gastroschisislike normal population. Gastroschisis typically presents with a small, poorly developed abdominal cavity. Nonrotation occurs almost universally, because the intestines are outside.Cryptorchidism isvery common association up to 30percent, Intestinalatresia's 5-10%. Mode of Deliverywhethervaginal or caesarean delivery, does not have significant differences in gastroschisisoutcome(8).Preoperative management of the gastroschisis patientinclude factors that influence the outcome negatively are hypothermia, dehydration, gastric distention and intestinal vascular compromise, infection, hyaline membrane disease.Stabilization of the patient before the surgical repair is most importantforoptimumoutcome. The maintenance of intravenous fluid requirement for these newborns with gastroschisis is increased 2to 2.2 fold due to the excessive losses through the exposed bowel. Gastrointestinal decompression was done in right lateral decubitus position to enhance venous blood return from the gut. Primary closure of the abdominal defect is the aim. If primary closure cannot be done, the alternative is a staged Silo repair(9).Airway and intra-abdominal pressures kept less than 25 and 20 mmHg respectively, to prevent adverse hemodynamic consequences to other organs and tissues as well as to prevent abdominal compartment syndrome. Primary repair includes stretching of the abdominal wall, irrigating with warm saline and evacuationof meconium from bowl, evacuating the contents of the stomach, and enlarging the defect by with a ventral hernia creation. Abdominal compartment syndrome (10) may result after the tight repair, leading to venous compression with compromise renal blood flow and the glomerular filtration rate resulting in decreased urine output. Urinary catheter placed; 120 to 150 mL/kg/d of aisolyte-psolution is needed. Paralyticileus is frequently seen in the postoperative period and may persist for several weeks. Nasogastric tube drainage has to be replaced. CPAP and Ventilatory support may be required. Enteral feeds and TPN may be considered as early as possible. Early Enteral feeding with human milk decreases time to discharge in infants following gastroschisis

ISSN 2515-8260 Volume 9, Issue 3, Winter 2022

repair. Postoperative TPN the minimal daily requirements are 100 kcal/kg/day, 3 to 4 g/kg/dayintravenous lipids, 3 g/kg/dayprotein, and dextrose to maintain euglycemia. Early postsurgical management of the infant with gastroschisis includes monitoring of vital signs, fluid and electrolyte balance maintenanceand pain management, cardiovascular and respiratory stabilization. After the repair, intra-abdominal pressure monitoring and observe forvenous compression. A urinary catheter may be useful to relieve bladder distention and to allow for a more accurate assessmentof urine output. Electrolyte balance to be maintained .A large-bore nasogastric/orogastric tube intermittent suction is needed to prevent gastrointestinal distention caused by hypoperistalsis. Adynamic ileus or hypoperistalsis is frequently seen in the postoperative period and may persist for several weeks. The early gastrointestinal drainage is characteristically green because of the stasis of biliary and pancreatic secretions in the immediate postoperative period. Once gut motility improves, the drainage becomes clear in appearance. Nasogastric/orogastric tube loses has to be replacedto maintain homeostasis. Because of the postoperative increased intra-abdominal pressure, close monitoring of respiratory status is essential for the first 48 to 72 hours.Respiratory support may be required to optimize oxygenation and ventilation. High abdominal pressure may interfere with optimal expansion of the diaphragm and venous return, impeding both ventilation and oxygenation. Some infants may benefit from Continuous Positive Airway Pressure (CPAP) ormechanical ventilation to maximize lung expansion, lung volume and oxygenation. Central Venous Pressure (CVP) must be continuously monitored during CPAP, because of its hindering effect on the CVP. Some infants may not tolerate CPAP, because of increased abdominal distention due to increased airflow to the gastrointestinal track.Aproperly functioning nasogastric/orogastric tube will minimize this risk.Outcomes are affected by cholestasis secondary to long-term TPN, malrotation, midgut volvulus, hypoperistalsis, Gastroesophageal Reflux (GER) and aspiration pneumonia.

The most common complications resulting in increased morbidity and mortality are intestinal atresia/stenosis, sepsis and Necrotizing Enterocolitis (NEC). Intestinal atresia is considered a poor prognostic factor in infants with gastroschisis with mortality ranging from 40% to 60%. Intestinal atresia is seen in approximately 5% to 25% of newborns with gastroschisis.

Infection is another complication associated with gastroschisis defects. Sepsis was responsible for 70% of all mortality. NEC is a common complication that occurs in approximately15- 20% of all infants with gastroschisis. Possible late complications such as strictures, bowel adhesive obstruction and GER may be seen. Infants were classified as “simple” defect without atresia, volvulus. Infants classified as complex (11) included those infants with atresia, stenosis, volvulus “complex” gastrointestinal problems. The survival rate of low-risk infants was more than 90% compared with 60% for the high-risk infants. The most common long-term complications noted were problems related to the abdominal scar (30%) and functional gastrointestinal problems such as GER (50%).

ISSN 2515-8260 Volume 9, Issue 3, Winter 2022

MATERIALSAND METHODS

Retrospective study of neonates admitted with diagnosis of Gastroschisis; presented with eviscerated edematous bowel, sepsis, respiratory distress, hypothermia, hypovolemic shock. Ninety sixGastroschisis patientswere admitted duringthespanof sevenyears(January 2015toDecember 2021),male patients–54(56.25%),female patients–42(43.75%). Pediatric surgery department in government general hospital, Guntur Medical College, Guntur is mid-level referral hospital for six districts,approximately 15 million population. Allthe patients presented to us within 48 hours. Generalobservation is that most of these patients belongs to low socioeconomic group. Most of these patients come to government hospital only due to financial reasons. Those patients who presentedwith severe sepsis withvery poor general condition andexpiredbefore anysurgical intervention were excluded from study. Nine patients died before any surgical intervention done.

METHODS

During study period ninety-six patients were treated; studied as two groups, Simple gastroschisis and complex gastroschisis depending upon presence or absence of intestinal perforation, necrosis, stenosis, malrotation and volvulus and intestinal atresia. Simple gastroschisiscases 74(77.08%), complex gastroschisis cases 22(22.91%) studied.Primary reduction ofeviscerated bowel and fascial layer closerof abdominal wall was selected as initial surgical procedure in patients withstable general condition and smaller size of the eviscerated bowl mass which can be accommodated in abdominal cavity . Primary surgical procedure done in 46 patients, Silo construction and later repair done in 28 patients in simple gastroschisisgroup in which primary surgical procedure cannot be done due to poor general condition and high volumeedematous thick bowl.Complex gastroschisisgroup22 cases, (Twelve intestinal atresia cases, three perforations, necrosis of small bowl in three cases, volvulus with impending gangrene due tonarrow stalk with small defect in three cases, one patient total gangrene of midgut). Procedure done in Complex gastroschisis. 1) Exclusively surgical repair only in 11cases2).Initial surgical procedure followed by silo in7 cases 3) Initial silo followed by surgical procedure in 4 cases (missed the atresiainitially). Operative technique was release of bands and gentleadhesion lysisanddecompressionofthebowelandreductionofgutthroughtheexistingabdominalwalldefect with or without widening.

Sex	Total cases	Simple gastroschisis	Complex gastroschisis
Male	54 (56.25%)	42(56.75%)	12(54.54%)
Female	42 (43.75%)	32 (43.24%)	10 (45.45%)
Total	96	74	22

Table 1- Distribution ofcases

Type of gastroschisis	Primary surgical repair	Silo followed bysurgery	survival	deaths
Simple 74 cases--primary surgical repair	46	-	41(89.13%)	5
Simple gastroschisis SILO followed by surgery		28	19 (67.85%)	9
Complex22 cases---primary surgical repair	11	-	8 (72.72%)	3
Complex gastroschisis, SILO followed by surgery		11	5 (45.45%)	6
Total cases96	57 (59.37%)	39 (40.62%)	73 (76.04%)	23 (23.95%)

Table 2: Type of Procedure and survivals.

Primary surgicalrepairin simple gastroschisis41 patients survived(89.13%) . Silofollowed by surgeryin simple gastroschisis 19 patients survived (67.85%). Primary surgicalrepair casesin complexgastroschisis8 patients survived (72.72%). Silofollowed by surgeryincomplexgastroschisis 5 patients survived(45.45%).Simple gastroschisis group totalsurvival 60patients (81.08%), deaths 14,(18.91%).Complex gastroschisis group total survival l3 patients (59.09%)death 9(40.90%).

Management:

Most of the babies with gastroschisis presented to us with dehydration and hypothermia. Many ofthese patients eviscerated bowl is covered withcotton pads, old cloths, gauze bandageand some are with meconium staining bowl. After securing reliable IV access and orogastric tube or nasogastric tube passed todecompress the stomach, IV fluids bolus 20 ml per kg was given. After stabilizing hemodynamically and hypothermia corrected, the unsterile looking dressings were removed.Removed the flakes and cotton fibers from surface of the bowel. Thorough wash was given with warm normal saline. Examined the size of the defect, status of the bowl wall whether pliable, soft or thick, edematous, stiff. We look for any intestinal atresia, gangrene bowl, impending strangulation, twisting or volvulus, necrosis of bowl, bowl and mesentery tears. Colonic irrigations were done with warm normal saline to evacuate meconium in the colon along

ISSN 2515-8260 Volume 9, Issue 3, Winter 2022

with milking of meconium in midgut with sterile precautions. We covered the newborn once they reach us, by sterile dressing with sterile plastic bag then assessment was made whether to do primary closure with reduction of bowl or Silo construction followed by surgical repair .Stabilization of the patients from hypothermia, hypovolemic shock was done. Cleaning ofthe eviscerated bowel with warm normal saline. Broad spectrum antibiotics given. Injection ceftriaxone 100 mg per kilogram, Inj. amikacin 15 mg Inj. Metronidazole 2 mL per kilogram, injection vitamin K one mg stat, ranitidine 5 mg given. NGT inserted and decompressed the stomach and small bowel. Rectal wash with warm normal saline to evacuate meconium. Preoperative evaluation for associated anomalies and basic surgical workup done including hemogram, blood grouping and typing. Throat suction done and oxygenwas givenby mask administered. Intravenous fluids Isolyte P given 150 ml per kg. Corrected electrolyte imbalances. Kept under warmers. Monitored vital signs

Weight Range 1kg to 2.5 kg	**No of patients**	**male**	**female**
Less than 1.5 kg	**23**	**14**	**9**
1.5 kg to 2.0 kg	**60**	**32**	**28**
2.0 kg to 2.5 kg	**13**	**8**	**5**
	96	**54**	**42**

Table 3- weight andsex details. (12)

All patients presented within 48 hours

Antenatal detection was noted in 16 patients, male 9 patients,female 7 patients.

Gestational age	No of patients	Male	Female
Less than 28 weeks	6	3	3
28-32 weeks	34	18	16
32-36 weeks	**51**	31	20
More than 36 weeks	**5**	2	3
Total	**96**	54	42

Table- 4 Gestational agedetails (13).

Data collected regardingmode of delivery shows 72 cesarian sections, 24vaginal deliveries .One patient hadfamily history ofgastroschisis in siblingwho was successfully operated and surviving withoutany problems

Surgical Management

Primary reduction of eviscerated bowel and repair of abdominal wall was selected as initial surgical management in 46 patients.

Silo construction was selected as initial procedure in 28 patients.

Silo was selected when primary repair was not feasible because ofsize of the edematous bowel andpoor general condition in simple gastroschisis group.

Primary Reduction and Repair

Under general anesthesia, bowel was cleaned with warm saline and flakes over bowel were cleared. Bands released and adhesion lysis was done. Decompression of the bowel and reduction of gut through the existing abdominal wall defect without widening if bowl is less edematous and pliable. If bowlis grossly edematous and stiff, extending the incision along midline Linea Alba was the primary modality of management; 3-0 vicryl and 3-0 prolene was used for repair. Totalof 57 patients underwent primary reduction and repair (46 simple gastroschisis, 11 complex gastroschisis).

SILO Reconstruction

39 patients underwent Silo reconstruction as primary reduction and repair was not possible due to large volume of edematous bowel and small abdominal cavity(28 simple gastroschisis, 11

complexgastroschisis). Silo was constructed with Prolene mesh on the outside and Urobag insideor double mesh (vicryl-prolene mesh). Mesh was anchored to the abdominal wall with 3-0 prolene. Every alternate day, reduction of the size of Silo was done in NICU and primary muscular closure or skin closure was done when size of abdominal cavity was adequate.

Hospital stay in simple Gastroschisis ranging from 12 days to 48 days, mean hospital stay was 24.6 days. Complex Gastroschisis cases hospital stay ranging from 18 days to 94 days, mean hospital stay was 48.6 day.Trial feedingstarted6th day onwards with parenteralnutritional support with amino acids and fatty acids solutions (Astymin 3 and intralipid 20%).umbilical vein was usedfor infusion. Ventilatory support was given in simple Gastroschisis (24 patients)ranging from 2 days to 34 days , mean support 5.4 days, in Complex GastroschisisVentilatory support(18 patients) ranges from 5days to 42 days, mean 16.2 days support. No CPAP supportgiven in our institute.

Discussion

Gastroschisis is a full-thickness abdominal wall defect on right paraumbilical region without a covering membrane. Gastroschisis rarelyassociated with malformations (14)outside of the gastrointestinal tract. Gastrointestinal problems (stenosis, intestinal atresia, perforation, necrosis, volvulus, malrotation) may present in up to 25% of cases. Maternal serum alpha-fetoprotein (AFP) is increasedingastroschisis. Prenatal ultrasound shows free-floating bowel loops andparaumbilical abdominal wall defect. Mode of delivery has no significant effect on outcome of gastroschisis. Trial of labor rather than cesarean birthcan be tried for, except the liver is significantly herniated. Rarely intrauterine growth restriction (IUGR) may be associated. Infants with gastroschisis have the most favorable prognosis and with excellent long-term outcomes when Compared to other abdominal wall defects. Overall survival rateis 80 to 95 percent in gastroschisis neonates born. Complex gastroschisis have more severe gastrointestinal, respiratory, and infectious complications in the neonatal period with high in-hospital mortality, bowel obstruction, short bowel syndrome, necrotizing enterocolitis, need parenteral nutrition, and tube feedings on discharge. Complex gastroschisis also likely to have a longer hospitalization. Most newborns with gastroschisis have an intestinal rotational anomaly. The incidence of volvulus higher in omphalocele than gastroschisis. Intestinal adhesions and adhesive bowel obstruction are more common in gastroschisis. Undescended testis is associated with 15% to 30% of gastroschisis cases with orchiopexy in the first year of life. Cosmetic umbilicoplasty or umbilical reconstruction surgery can be consideredfor psychosocial stress if umbilicus not present. Neurodevelopment, learning issues, and overall health-related quality of life to be within a normal range in these children. Preterm delivery is common with gastroschisisup to 28% compared to normal 6% .Complications can occur with total parenteral nutrition (TPN) and line sepsis, necrotizing enterocolitis (NEC), and abdominal wound infections. If associated with intestinal complications such as atresia, ischemia, perforation, or development of necrotizing enterocolitis consider as complex gastroschisis andhave a higher mortality rate, may need multiple operative interventions, and prolonged hospitalization, high rates of sepsis, and

prolonged cholestasis and intestinal transplantation due to intestinal failure. Approximately 10% of newborns with gastroschisis have associated atresia, mostly jejunal or ileal, will have significantly worse outcomes. The timing of surgical management of the atresia depends on the state of the bowelwall inflammation to hold sutures well. Early versus late operations (before or after 21 days of life) for intestinal atresia ,no significant difference in outcomes and potential for early feeding between the two groups noted. Team work of specialists, including an obstetrician, pediatric surgeon and neonatologist essential for optimal outcome. The best time for deliverymay be near term. Controversies in managementinclude primary surgical closure or suture less closure, mode of delivery, timing of delivery, silo versus surgical closure, time of treatingintestinal atresia. The outcomes of gastroschisis depend on the birth weight, prematurity, comorbidities, and the state of the bowel (atresia, vanishing gastroschisis, vascular compromise of bowel).

CONCLUSION: Retrospective study of gastroschisis patients admitted in our hospital from 2015to2021. Total number of patients were 96; Simple gastroschisis74 cases,46 primary surgical repairs41 (89.13%) survived,28 silo s with19 patients survived(67.85%).Complex gastroschisis group22 cases, 13(59.09%)patients survived(15) .Total patients survived 73(76.04%)out of 96 patients with overall deaths 23 (23.95%).Most of the deaths occurreddue to sepsis and prematurity with low birth weight. With limited facilities, Simple gastroschisisgroup survival good 81.08%and overall survival rate of 76.04% couldbeachieved in the department**.**

References-

1.PauloAcácioEgger, MakcileniParanhode Souza, Cristiane de OliveiraRiedo, Amanda de CarvalhoDutra , Mariana Teixeirada Silva , Sandra MarisaPelloso , Maria Dalva de BarrosCarvalho.Gastroschisis annual incidence, mortality, and trends in extreme Southern Brazil. Jornal de Pediatria,Volume 98, Issue 1, January–February 2022, Pages 69-75.

2.SylvieBeaudoin - Insights into the etiology and embryology of gastroschisis,Seminars in Pediatric SurgeryVolume 27, Issue 5, October 2018, Pages 283-288

3.KLJones,KBenirschke,CD ChambersGastroschisis: etiology and developmental pathogenesis.clinical genetics Volume 75, Issue 4 Pages: 307-407 April 2009.https://doi.org/10.1111/j.1399-0004.2009.01164.x

4.F Bahlmann [1], E Merz, G Weber, D Macchiella. Prenatal diagnosis and management of gastroschisis and omphalocelePediatrSurgInt . 1996 Mar;11(2-3):67-71. doi: 10.1007/BF00183728. PMID: 24057519

5.Robert Bergholz [1], Michael Boettcher [2], Konrad Reinshagen [2], Katharina Wenke [2]Complexgastroschisis is a different entity to simple gastroschisis affecting morbidity and

mortality-a systematic review and meta-analysisJPediatr Surg. 2014 Oct;49(10):1527-32. doi: 10.1016/j.jpedsurg.2014.08.001.Epub 2014 Sep 4.PMID: 25280661DOI: 10.1016/j.jpedsurg.2014.08.001

6. J C Langer [1]Gastroschisis and omphalocele. SeminPediatr Surg. 1996 May;5(2):124-8. PMID: 9138711

7.Victor M. Salinas-Torres, Rafael A. Salinas-Torres, Ricardo M. Cerda-Flores, Hugo L. Gallardo-Blanco & Laura E. Martínez-de-VillarrealA clinical-pathogenetic approach on associated anomalies and chromosomal defects supports novel candidate critical regions and genes for gastroschisis*Pediatric Surgery International* volume 34, pages931–943 (2018)

8. Adriana Lopez [1], Renata H Benjamin [1], Janhavi R Raut [1], AnushuyaRamakrishnan [1], Laura E Mitchell [1], KuojenTsao [2], Anthony Johnson [3 4], Peter H Langlois [5], Michael D Swartz [6], A J Agopian [1]·Mode of delivery and mortality among neonates with gastroschisis: A population-based cohort in Texas.
PaediatrPerinatEpidemiol . 2019 May;33(3):204-212. doi: 10.1111/ppe.12554. Epub 2019 May 14.PMID: 31087678.

9. Ashwini S Poola [1], Pablo Aguayo [2], Jason D Fraser [2], Richard J Hendrickson [2], Katrina L Weaver [2], Katherine W Gonzalez [1], Shawn D St Peter [1] **Primary Closure versus Bedside Silo and Delayed Closure for Gastroschisis: A Truncated Prospective Randomized Trial**Eur J Pediatr Surg. 2019 Apr;29(2):203-208. doi: 10.1055/s-0038-1627459. Epub 2018 Feb 19. PMID: 29458229.

10.AstaTauriainen [1], Ulla Sankilampi [2], ArimatiasRaitio [3], TuomasTauriainen [4], IlkkaHelenius [5], Kari Vanamo [6], Anna Hyvärinen [7]·The association of perinatal and clinical factors with outcomes in infants with gastroschisis-a retrospective multicenter study in Finland
Eur J Pediatr . 2021 Jun;180(6):1875-1883.doi: 10.1007/s00431-021-03964-w. Epub 2021 Feb 2.PMID: 33532890

11. Sherif Emil [1]
Surgical strategies in complex gastroschisis
SeminPediatr Surg. 2018 Oct;27(5):309-315. doi: 10.1053/j.sempedsurg. 2018.08.003. Epub 2018 Aug 25. PMID: 30413262. DOI: 10.1053/j.sempedsurg.2018.08.003

12. TatianeBoute [1], Giuseppe Rizzo [2], IleniaMappa [2], Alexander Makatsariya [3], Bruno Rodrigues Toneto [1], Antonio Fernandes Moron [1], LiliamCristineRolo [1] Correlation between estimated fetal weight and weight at birth in infants with gastroschisis and omphaloceleJ Matern Fetal Neonatal Med. 2020 Aug 19;1-6. doi: 10.1080/14767058.2020.1808615.PMID: 32814485

14. I-Lun Chen [1], Shin-Yi Lee, Mei-Chen Ou-Yang, Pei-Hsin Chao, Chieh-An Liu, Feng-Shun Chen, Mei-Yung Chung, Chih-Cheng Chen, Hsin-Chun Huang
Clinical presentation of children with gastroschisis and small for gestational age
PediatrNeonatol. 2011 Aug;52(4):219-22. doi: 10.1016/j.pedneo.2011.05.012. Epub 2011 Jun 11.PMID: 21835368 DOI: 10.1016/j.pedneo.2011.05.012

14. Cecilia Caldeman, Anna Fogelström , Jenny Oddsberg , Carmen Mesas Burgos , Anna LöfGranström --- National birth prevalence, associated anomalies and mortality for gastroschisis in SwedenActaPaediatr. 2021 Sep;110(9):2635-2640. doi: 10.1111/apa.15954. Epub 2021 Jun 4. PMID: 34036643.

15.KirstenRisby [1], Steffen Husby [2], NielsQvist [3], Marianne S Jakobsen [4]
High mortality among children with gastroschisis after the neonatal period: A long-term follow-up study
J Pediatr Surg. 2017 Mar;52(3):431-436. doi: 10.1016/j.jpedsurg.2016.08.022. Epub 2016 Sep 2.PMID: 27665495