CERPO

Centro de Referencia Perinatal Oriente

Facultad de Medicina, Universidad de Chile

EVALUACION PRENATAL DE LA GASTROSQUISIS

DRA ANA LUISA PEREZ

BECADA MMF U DE CHILE

Generalidades

FUE DESCRITA EN 1733

DEFECTO DE PARED ABDOMINAL CON HERNIACION DE CONTENIDO ABDOMINAL , FUNDAMENTALMENTE ASAS INTESTINALES

PERIUMBILICAL , HABITUALMENTE A LA DERECHA DE LA INSERCION DEL CORDON

Generalidades

ETIOPATOGENIA

- 6-10 SEMANAS DE GESTACION
- MULTIPLES TEORIAS

Generalidades

PREVALENCIA Y FACTORES DE RIESGO

4/10.000 NACIDOS VIVOS ….

AUMENTO ULTIMAS DÉCADAS

Generalidades

FACTORES DE RIESGO

GRUPO ÉTNICO

EDAD MATERNA MENOR DE 20 AÑOS

USO DE DROGAS

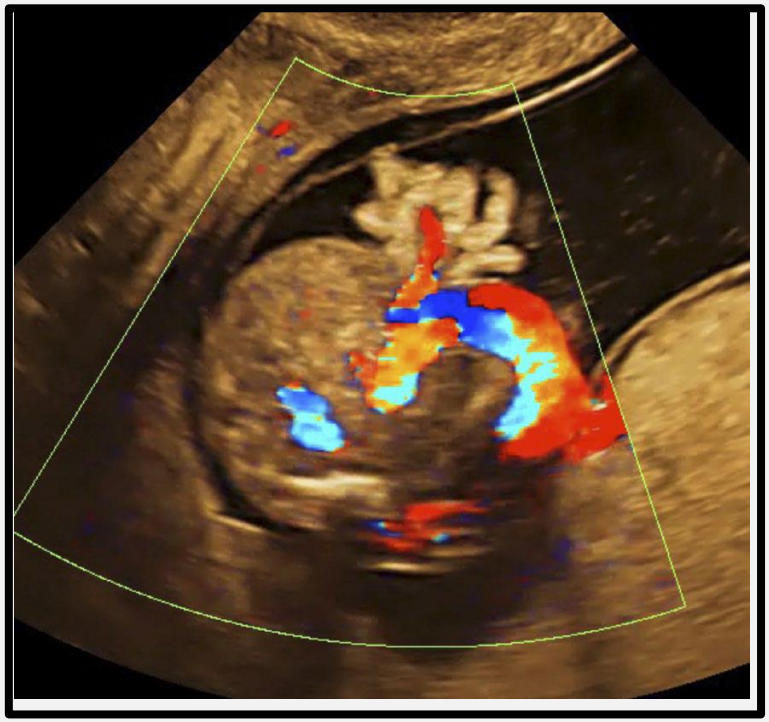
ALGUNOS MEDICAMENTOS

HABITO TABAQUICO

DIAGNÓSTICO

EVALUACION DE LA PARED ABDOMINAL FETAL

DIAGNÓSTICO



DIAGNÓSTICO

TABLE 1
Comparison of Gastroschisis and Omphalocele

	Gastroschisis	Omphalocele
Definition	*Gaster* = belly; *schisis* = cleft Full thickness abdominal wall defect, to the right of the umbilicus, with extruded intestinal loops without a membranous covering	*Omphalos* = umbilicus; *cele* = hernia Herniation of internal organs through an umbilical defect, contained in a 3-layer membrane Usually contains small intestines, liver, spleen, colon, sometimes gonads
Incidence	4 per 10,000 pregnancies	4 per 10,000 pregnancies
Risk factors	Maternal young age, low BMI, smoking	More common in women <20 or >40 y
Associated anomalies	Rare[24,25]	Frequent[24–26]
Pathogenesis	Theories include failure of the mesoderm to form the body wall, rupture of amnion around the umbilical ring, abnormal involution of the right umbilical vein leading to weakening of the body wall, and disruption of the right vitelline artery, or yolk sac artery, with subsequent body wall damage[5]	Failure of bowel loops that do not return to abdominal cavity after embyologic herniation of umbilical cord at weeks 6–10 gestation
Ultrasound Findings	Defect often to right of umbilical cord; herniated bowel lacks membranous covering	Defect is centrally located, herniated loops of bowel and sometimes liver, with covering membrane If sac is ruptured, it may appear like gastroschisis but with abnormal umbilical cord and a remnant omphalocele sac.
Genetics	0.1% have abnormal karyotype[27]	30%–40% have abnormal karyotype High rate of termination of pregnancy (30%–50%) due to associated anomalies

BMI, body mass index.

HISTORIA NATURAL

ASOCIACIÓN A RESULTADOS PERINATALES ADVERSOS

RCIU

PHA

OHA

PARTO DE PRETERMINO

MUERTE FETAL IN UTERO

HISTORIA NATURAL

PATOLOGIA ASOCIADA :

HASTA UN 25% PRESENTA PATOLOGIA GASTROINTESTINAL ASOCIADA

TÉRMINO GASTROSQUISIS COMPLEJA

ASOCIACIÓN A CARDIOPATÍAS HASTA EN UN 5%

ASOCIACIÓN A DEFECTOS SNC 12%

HISTORIA NATURAL

ASOCIACIÓN CON RCIU : 30%-60%

NO ES DE ORIGEN PLACENTARIO

TEORIA PÉRDIDA DE PROTEINAS Y ASOCIACION CON FACTORES DE RIESGO COMO BAJO NIVEL SOCIOECONOMICO , HABITO TABAQUICO

HISTORIA NATURAL

TABLE 2
Test Characteristics of Ultrasound Formulas for Predicting Fetal Growth Restriction Less Than the 10th Percentile[41] (n = 62)

Formula	Sensitivity	Specificity	PPV	NPV	Accuracy
Hadlock	0.89	0.70	0.55	0.94	0.74
Shepard	0.78	0.84	0.67	0.92	0.82
Seimer	0.67	0.86	0.67	0.86	0.80

Accuracy = (sensitivity) (prevalence) + (specificity) (1 – prevalence).
PPV, positive predictive value; NPV, negative predictive value.

HISTORIA NATURAL

OHA : AFECTA EL 10 %-25% DE LOS FETOS CON GASTROSQUISIS

POLIHIDROAMNIOS : SE ASOCIA CON ATRESIA INTESTINAL (OR,3,76;1.7-8.3)

DANTONIO F, VIRGONE C, RIZZOG,ET aL. PRENATAL RISK FACTORS AND OUTCOME IN GASTROSCHISIS.A META-ANALISYS PEDIATRICS 2015; 136: e159-e169

HISTORIA NATURAL

ASOCIACIÓN CON PARTO PREMATURO

TANTO ESPONTÁNEO COMO IATROGÉNICO QUE VARIA DE 28%-61%

MUERTE FETAL IN UTERO 4.5-12.5%

CAUSA DESCONOCIDA

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www.bjog.org

Fetal medicine

Is complex gastroschisis predictable by prenatal ultrasound?

M Kuleva,[a] N Khen-Dunlop,[b] Y Dumez,[a] Y Ville,[a,c] LJ Salomon[a,c]

[a] Department of Obstetrics and [b] Department of Paediatric Surgery, Hôpital Necker Enfants Malades, Assistance Publique, Hôpitaux de Paris, Université Paris Descartes and [c] Société Française pour l'Amélioration des Pratiques Echographiques, Paris, France
Correspondence: Dr LJ Salomon, Department of Obstetrics and Gynaecology, Hôpital Necker-Enfants Malades, 149 Rue de Sevres, 75015 Paris, France. Email laurentsalomon@gmail.com

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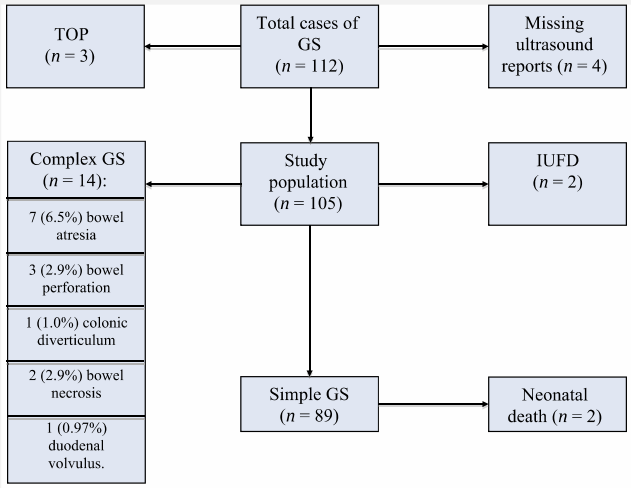

Figure 1. Gastroschisis population flow chart. GS, gastroschisis; IUFD, intrauterine fetal death; TOP, termination of pregnancy.

Table 1. Demographic characteristics and pregnancy data of the study population

Characteristic	Value
Maternal age (years)	25.7 ± 4.7; 26 (22–29)
Parity	
0	81 (77.1%)
1	17 (16.2%)
2	5 (4.8%)
3	2 (1.9%)
Gestational age at diagnosis (weeks)	16.0 ± 4.73; 14 (12–18)
Small-for-gestational-age fetuses	26 (24.8%)
Extra-abdominal bowel dilatation	96 (89.7%)
Gestational age at diagnosis (weeks)	31.1 ± 3.4; 32 (30–33)
Maximum diameter (mm)	19.9 ± 6.7; 19 (16–23)
Intra-abdominal bowel dilatation	37 (34.6%)
Gestational age at diagnosis (weeks)	30.8 ± 4.2; 32 (28–34)
Maximum diameter (mm)	15.6 ± 6.2; 15 (11–18)
Stomach dilatation	12 (11.2%)
Gestational age at diagnosis (weeks)	32.8 ± 2.2; 32.0 (31.8–34.3)
Stomach herniation	6 (5.6%)
Gestational age at diagnosis (weeks)	35.3 ± 1.0; 35.0 (35.0–35.8)
Thickened bowel wall	22 (20.6%)
Gestational age at diagnosis (weeks)	32.4 ± 6.6; 33.5 (32.0–35.0)
Maximum diameter (mm)	3.6 ± 0.6; 3.4 (3.0–4.0)
Gestational age at birth (weeks)	35.7 ± 1.5; 36.0 (35.0–36.7)
Birthweight (g)	2337 ± 508; 2325 (2005–2700)
Type of delivery	
Vaginal	5 (4.7%)*
Elective caesarean section	68 (64.8%)
Emergency caesarean section	32 (30.5%)
Umbilical artery pH at birth	7.31 ± 0.09; 7.31 (7.26–7.38)

Data are reported as mean ± SD, median (interquartile range) and frequencies.
*Including intrauterine fetal death.

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Is complex gastroschisis predictable by prenatal ultrasound?

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Correspondence: Dr LJ Salomon, Department of Obstetrics and Gynaecology, Hôpital Necker-Enfants Malades, 149 Rue de Sevres, 75015 Paris, France. Email laurentsalomon@gmail.com

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Table 2. Neonatal outcome in two groups

	Complex GS (14/103)	Simple GS (89/103)	*P* value
Gestational age at delivery (weeks)	35.5 ± 1.4	35.7 ± 1.5	0.64*
Caesarean section *n*(%)	14 (100)	86 (96.6)	1.0**
Birth weight (g)	2304 ± 417	2359 ± 469	0.68*
Apgar score at 5 minutes	10 (9–10)	10 (9–10)	0.73*
Ventilation (days)	3.5 (3.0–9.3)	3.0 (2.0–4.5)	0.22***
Primary closure	1 (7.1%)	55 (61.8%)	<0.001**
Bowel resection, *n*(%)	14 (100)	5 (5.6)	<0.001**
Stomas required	11 (78.6%)	1 (1.1%)	<0.001**
Number of interventions	3.29 ± 2.12	1.71 ± 1.09	<0.001**
Median time on parenteral nutrition (days)	101 (45–405)	33 (25–53)	<0.001***
Median duration of hospital stay (days)	110 (62–240)	41.0 (33.0–63.5)	<0.001***

Data are reported as mean ± SD, median (interquartile range) and frequencies.
*Student's *t* test, **Fisher's exact test, ***Mann–Whitney *U* test.

Table 3. Ultrasound findings in the two groups

	Complex GS (14/103)	Simple GS (89/103)	*P* value
Small for gestational age	4	22	0.758*
Extra-abdominal bowel dilatation	12	83	0.329*
Gestational age at diagnosis (weeks)	30.7 ± 2.0	31.1 ± 3.6	0.69***
Maximum bowel diameter (mm)	19 (5–34)	18 (5–40)	0.73
Intra-abdominal bowel dilatation	9	27	0.018*
Gestational age at diagnosis (weeks)	28.1 ± 3.6	31.9 ± 3.9	0.011***
Maximum bowel diameter (mm)	15 (3–16)	3 (2–10)	0.028**
Dilatation of multiple intra-abdominal loops	2	1	0.048*
Stomach dilatation	3	9	0.208*
Stomach herniation	2	4	0.187*
Thickened bowel wall	4	18	0.491*

Data are reported as mean ± SD, median (interquartile range) and frequencies.
*Fisher's exact test,**Mann–Whitney *U* test, ***Student's *t* test.

Table 4. Small bowel lumen size at different gestational age according to Parulekar[28]

Gestational age (weeks)	Average small bowel lumen size (mm)
>40	4.4
35–40	3.7
30–35	2.9
25–30	1.8
20–25	1.4
15–20	1.2
10–15	1.0

EL UNICO FACTOR ULTRASONOGRAFICO QUE SE PUDO CORRELACIONAR CON GASTROSQUISIS COMPLEJA FUE LA DILATACION INTRAABDOMINAL

HISTORIA NATURAL

Prenatal Risk Factors and Outcomes in Gastroschisis: A Meta-Analysis

Francesco D'Antonio, MD, PhD[a], Calogero Virgone, MD[b], Giuseppe Rizzo, MD[c], Asma Khalil, MD[a], David Baud, MD, PhD[d], Titia E. Cohen-Overbeek, MD, PhD[e], Marina Kuleva, MD[f], Laurent J. Salomon, MD, PhD[f], Maria Elena Flacco, MD[g,h], Lamberto Manzoli, MD, PhD[g,h], Stefano Giuliani, MD, PhD[b]

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BACKGROUND AND OBJECTIVE: Gastroschisis is a congenital anomaly with increasing incidence, easy prenatal diagnosis and extremely variable postnatal outcomes. Our objective was to systematically review the evidence regarding the association between prenatal ultrasound signs (intraabdominal bowel dilatation [IABD], extraabdominal bowel dilatation, gastric dilatation [GD], bowel wall thickness, polyhydramnios, and small for gestational age) and perinatal outcomes in gastroschisis (bowel atresia, intra uterine death, neonatal death, time to full enteral feeding, length of total parenteral nutrition and length of in hospital stay).

METHODS: Medline, Embase, and Cochrane databases were searched electronically. Studies exploring the association between antenatal ultrasound signs and outcomes in gastroschisis were considered suitable for inclusion. Two reviewers independently extracted relevant data regarding study characteristics and pregnancy outcome. All meta-analyses were computed using individual data random-effect logistic regression, with single study as the cluster unit.

RESULTS: Twenty-six studies, including 2023 fetuses, were included. We found significant positive associations between IABD and bowel atresia (odds ratio [OR]: 5.48, 95% confidence interval [CI] 3.1–9.8), polyhydramnios and bowel atresia (OR: 3.76, 95% CI 1.7–8.3), and GD and neonatal death (OR: 5.58, 95% CI 1.3–24.1). No other ultrasound sign was significantly related to any other outcome.

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CONCLUSIONS: IABD, polyhydramnios, and GD can be used to an extent to identify a subgroup of neonates with a prenatal diagnosis of gastroschisis at higher risk to develop postnatal complications. Data are still inconclusive on the predictive ability of several signs combined, and large prospective studies are needed to improve the quality of prenatal counseling and the neonatal care for this condition.

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The ultrasound signs analyzed in this review were as follows:

- Intraabdominal bowel dilatation (IABD)
- Extraabdominal bowel dilatation (EABD)
- Gastric dilatation (GD)
- BWT
- Polyhydramnios
- Small for gestational age (SGA)

The outcomes analyzed in this systematic review were as follows:

- BA
- IUD
- NND
- LOS
- TFEF
- LTPN

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- LOS DATOS NO PERMITIERON HACER ANALISIS PARA DIAS DE HOSPITALIZACION NI TIEMPO DE ALIMENTACIÓN PARENTERAL POR LA HETEROGENICIDAD

- **DILATACION INTRAABDOMINAL :**
  - 670 FETOS
  - ATRESIA INTESTINAL OR 5,48,(95%CI 3,1-9.8)
- **POLIHIDROAMNIOS :**
  - 602 FETOS
  - ATRESIA INTESTINAL OR 3,76 (95%CI 1,7- 8,3)
- **DILATACIÓN GASTRICA :**
  - 449 FETOS
  - MUERTE NEONATAL OR 5,58 (95% CI 1,7-8.3)

- LA DILATACIÓN EXTRAABDOMINAL, EL GROSOR DE LA PARED INTESTINAL Y LA RESTRICCIÓN DE CRECIMIENTO NO SE ASOCIARON CON LOS RESULTADOS EVALUADOS
- LIMITACIONES :
  - EL n DE CADA ESTUDIO
  - DEFINICIONES
  - MUCHOS ESTUDIOS NO REPORTABAN EDAD GESTACIONAL

TABLE 3 Description of Ultrasound Signs Used Among the Studies Included

Author	Year	IABD	EABD	GD	BWT	SGA (Percentile)
Overcash[23]	2014	—	—	—	—	<10th
Goetzinger[24]	2014	>6, >10, >14,[a] >18 mm	>6, >10, >14, >18 mm	—	>3 mm	—
Janoo[25]	2013	—	—	—	—	Not stated
Durfee[26]	2013	—	>8 mm	—	>1 mm	—
Emil[27]	2012	Not stated	Not stated	Not stated	—	<10th
Ghionzoli[6]	2012	>18 mm	>18 mm	Not stated	—	—
Overton[28]	2012	—	—	—	—	Not stated
Kuleva[3]	2011	>6 mm	>6 mm	>2 SD	>3 mm	<10th
Ajayi[29]	2011	—	—	—	—	<10th
Alfaraj[30]	2011	—	—	>2 SD	—	—
Mears[31]	2010	>10 mm	>10 mm	—	—	—
Contro[32]	2010	>6 mm	>6 mm	—	—	—
Garcia[33]	2010		>15, >20, >25, >30 mm	—	—	—
Huh[34]	2010	Not stated	—	—	—	—
Hidaka[35]	2009	—	—	—	—	—
Payne[10]	2009	—	—	—	—	—
Towers[36]	2008	—	—	—	—	—
Heinig[37]	2008	—	>15, >20, >25 mm	—	>3 mm	—
Cohen-Overbeek[38]	2008	—	>10 mm	—	—	<10th
Santiago-Munoz[39]	2007	—	—	GA dependent	—	—
Brantberg[40]	2006	Not stated	—	—	—	—
Nick[41]	2006	GA dependent	—	—	—	<10th
Puligandla[42]	2004	—	—	—	—	<5th
Aina-Mumuney[43]	2004	—	—	GA dependent	—	—
Strauss[44]	2003	—	29–42 mm	—	—	Not stated
Japaraj[45]	2003	—	>17 mm	—	>3 mm	<10th

[a] Most predictive cutoff in this study.

RESOLUCIÓN Y VIA DE PARTO

CONTROVERSIA MOMENTO DE INTERRUPCION

SE PROPONE QUE LA EXPOSICIÓN INTESTINAL A LÍQUIDO AMNIÓTICO ES TÓXICA

POR OTRO LADO ESTA EL TEMOR A LA MUERTE INTRAUTERINA

RESOLUCIÓN Y VIA DE PARTO

OBSTETRICS

Metaanalysis of the prevalence of intrauterine fetal death in gastroschisis

Andrew P. South, MD, MPH; Kevin M. Stutey, MD; Jareen Meinzen-Derr, PhD, MPH

OBJECTIVE: The objective of this study was to review the medical literature that has reported the risk for intrauterine fetal death (IUFD) in pregnancies with gastroschisis.

STUDY DESIGN: We systematically searched the literature to identify all published studies of IUFD and gastroschisis through June 2011 that were archived in MEDLINE, PubMed, or referenced in published manuscripts. The MESH terms *gastroschisis* or *abdominal wall defect* were used.

RESULTS: Fifty-four articles were included in the metaanalysis. There were 3276 pregnancies in the study and a pooled prevalence of IUFD of 4.48 per 100. Those articles that included gestational age of IUFD had a pooled prevalence of IUFD of 1.28 per 100 births at $\geq$36 weeks' gestation. The prevalence did not appear to increase at $>$35 weeks' gestation.

CONCLUSION: The overall incidence of IUFD in gastroschisis is much lower than previously reported. The largest risk of IUFD occurs before routine and elective early delivery would be acceptable. Risk for IUFD should not be the primary indication for routine elective preterm delivery in pregnancies that are affected by gastroschisis.

Key words: abdominal wall defect, fetal death, gastroschisis, IUFD, stillbirth

Cite this article as: South AP, Stutey KM, Meinzen-Derr J. Metaanalysis of the prevalence of intrauterine fetal death in gastroschisis. Am J Obstet Gynecol 2013;209:114.e1-13.

35 ARTICULOS ,1123 FETOS

LA MORTALIDAD FUE MENOR A LA REPORTADA EN LA LITERATURA

LA EDAD GESTACIONAL MEDIA AL PARTO FUE IGUAL EN LAS PACIENTES CON PARTO PLANIFICADO VS AQUELLAS QUE INICIARON TRABAJO DE PARTO ESPONTANEO

LA MORTALIDAD FETAL IN UTERO NO AUMENTÓ A PARTIR DE UNA DETERMINADA EDAD GESTACIONAL EN TERCER TRIMESTRE (36SEM)

LA MORTALIDAD FETAL EN TERCER TRIMESTRE NO DEBIESE SER EL FACTOR DETERMINANTE PARA PLANIFICAR INTERRUPCIONES ELECTIVAS DE RUTINA

CONCLUSION

La parte de imagen con el identificador...

POR EL MOMENTO NO SE HAN ENCONTRADO FACTORES ULTRASONOGRAFICOS CATEGÓRICOS QUE PUEDAN PREDECIR POR SI SOLOS GASTRSOQUISIS COMPLEJA

PROBABLEMENTE LA DILATACION INTRAABDOMINAL, PHA Y DILATACIÓN GASTRICA TENGAN UN ROL MAS CLARO

SI , SABEMOS QUE LA DILATACIÓN EXTRAABDOMINAL NO ES UN BUEN PREDICTOR

CONCLUSION

La parte de imagen con el identificador...

LA MORTALIDAD EN UTERO DE LA GASTROSQUISIS TIENDE A SER MENOR EN LA ULTIMA DECADA , PROBABLEMENTE RELACIONADO CON CUIDADOS NEONATALES

LA MORTALIDAD EN UTERO NO AUMENTA POSTERIOR A DETERMINADA EDAD GESTACIONAL

CONCLUSION

La parte de imagen con el identificador...

ES NECESARIO DETERMINAR CUALES SON LOS PUNTOS DE CORTE QUE SE CORRELACIONAN CON GC

LA DECISION FRENTE A LA SOSPECHA DEBE SER EVALUADA CASO A CASO , LO QUE OBLIGA A UN SEGUIMIENTO EXHAUSTIVO

CONCLUSION

La parte de imagen con el identificador...

NO HAY DATOS CATEGORICOS QUE DEMUESTREN QUE EL PRONÓSTICO DE LOS PACIENTES CON GASTROSQUISIS MEJORA AL REALIZARSE INTERRUPCIÓN PREMATURA ELECTIVA