THE VALUE OF POLYHYDRAMNIOS SIGN DIAGNOSIS FOR CONGENITAL ANOMALIES OF THE ALIMENTARY TRACT

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BACKGROUND

❖ Congenital digestive malformations is a common malformation in children.

❖ The rate of gastrointestinal tract abnormalities accounts for 15 % of all congenital malformations.

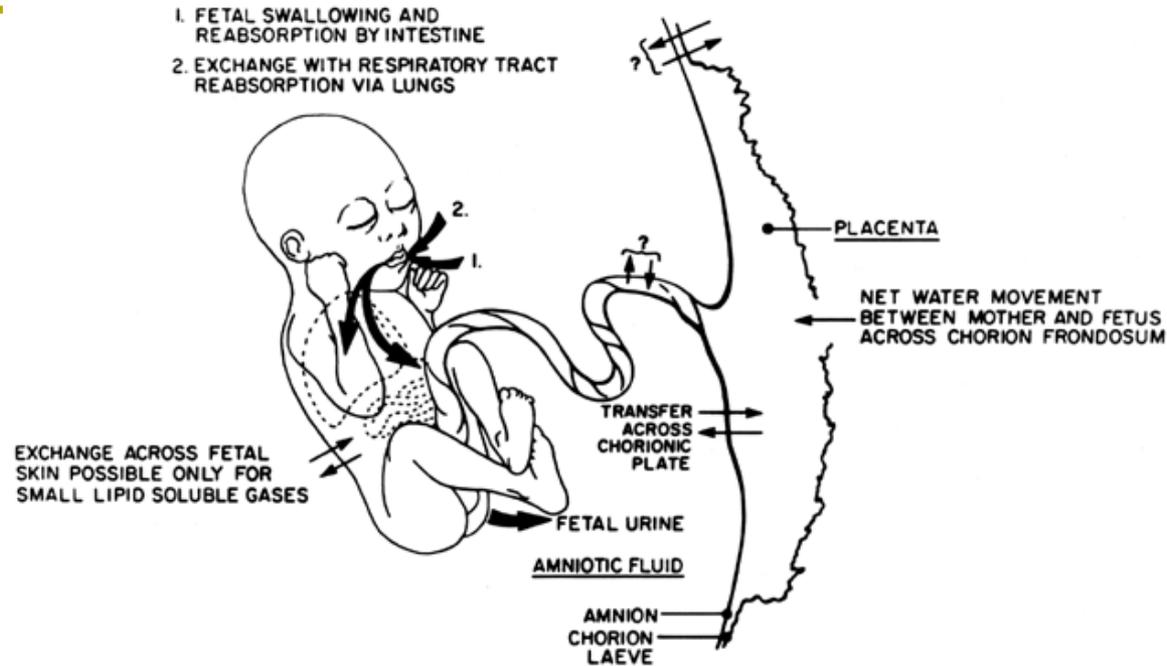❖ Polyhydramnios has a predictive value of 76.4% for fetal anomalies.

OBJECTIVES

Evaluate the value of the polyhydramnios for the diagnosis of each type of antenatal gastrointestinal malformation

AMNIOTIC FLUID DYNAMICS

1. FETAL SWALLOWING AND REABSORPTION BY INTESTINE
2. EXCHANGE WITH RESPIRATORY TRACT REABSORPTION VIA LUNGS

PLACENTA

NET WATER MOVEMENT BETWEEN MOTHER AND FETUS ACROSS CHORION FRONDOSUM

TRANSFER ACROSS CHORIONIC PLATE

EXCHANGE ACROSS FETAL SKIN POSSIBLE ONLY FOR SMALL LIPID SOLUBLE GASES

FETAL URINE

AMNIOTIC FLUID

AMNION
CHORION
LAEVE

- ❖ the product of water exchange between the mother, fetus, and placenta
- ❖ These disorders may result from abnormal fetal or maternal conditions
- ❖ The baby starts producing urine from 12 weeks, increasing 18-20 weeks, By near term, a fetus produces on average from 500 to 700 ml/day
- ❖ The baby can swallow amniotic fluid very early: 10 to 11 weeks (2-7 ml), near term swallow of 100-300ml / kg / day.

PATHOPHYSIOLOGY

Esophageal atresias and stenoses

- ❖ Interruption for elongation and serapation of the esophagus and tracheal tubes
- ❖ Incomplete recanalization of the esophagus
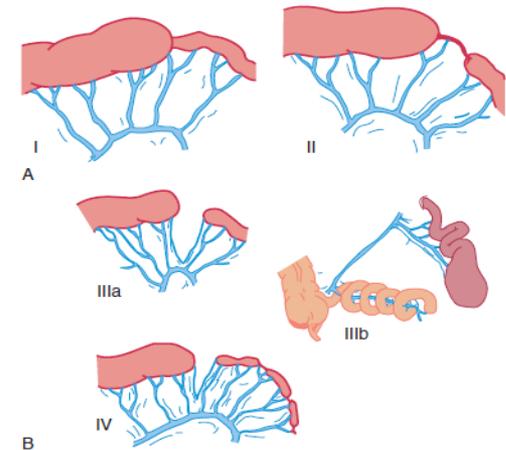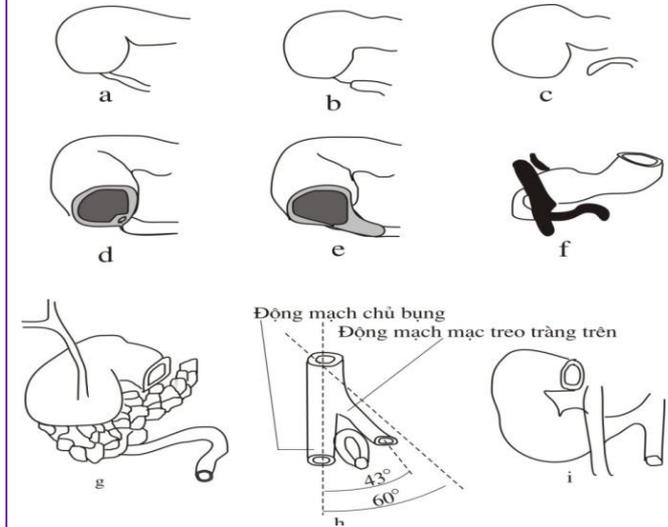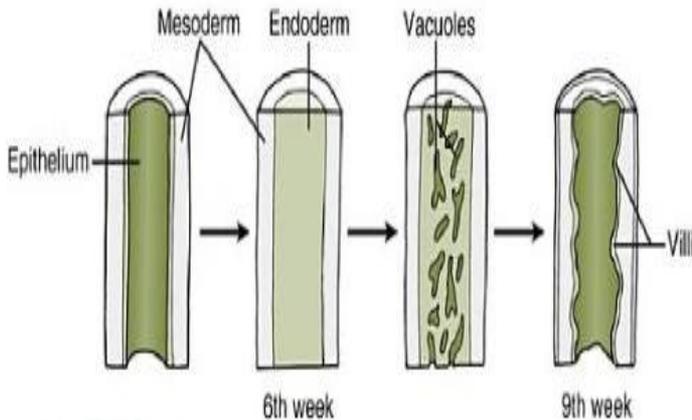- ❖ Abnormal tissue rests within esophageal wall.
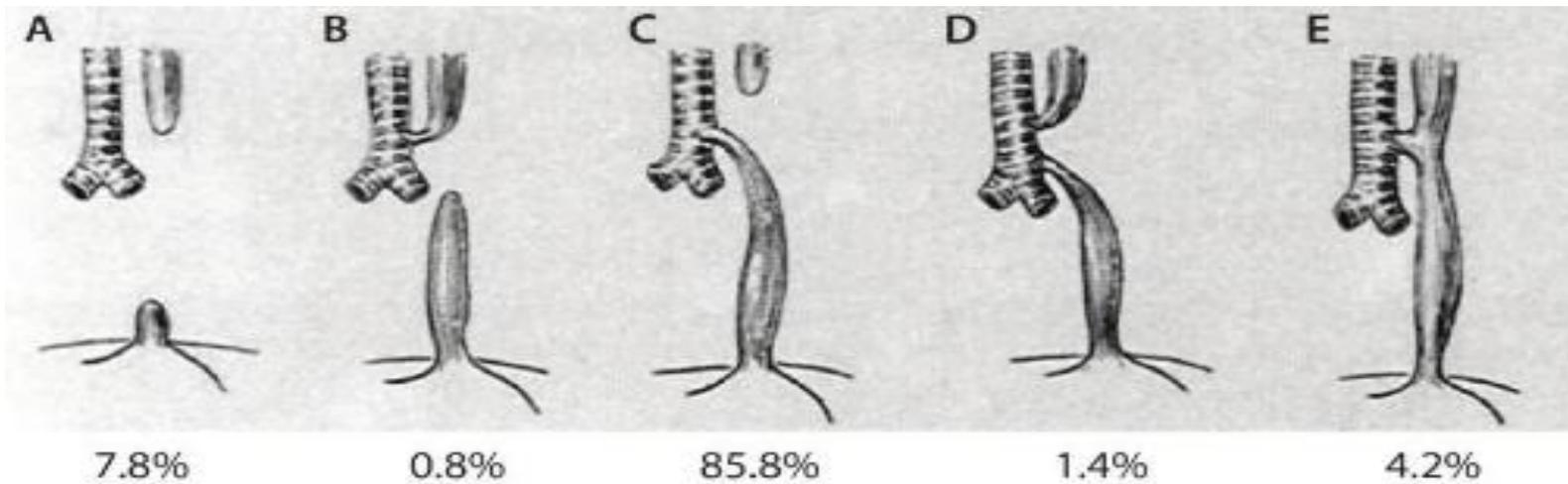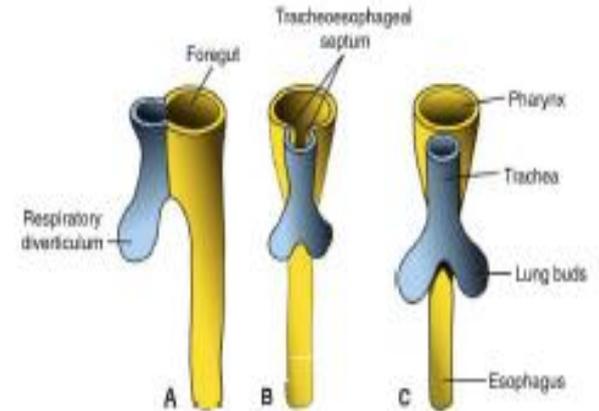
PATHOPHYSIOLOGY

* ***Duodenal atresias and stenoses***
* ➤ Failure of recanalization or incomplete intestinal rotation.
* ➤ Deformities of adjacent organs
* **Intestial atresias and stenoses**
* ➤ Tandler (1902): Failure of recanalization
* ➤ Louw and Barnard (1955): intrauterine mesenteric vascular accidents.
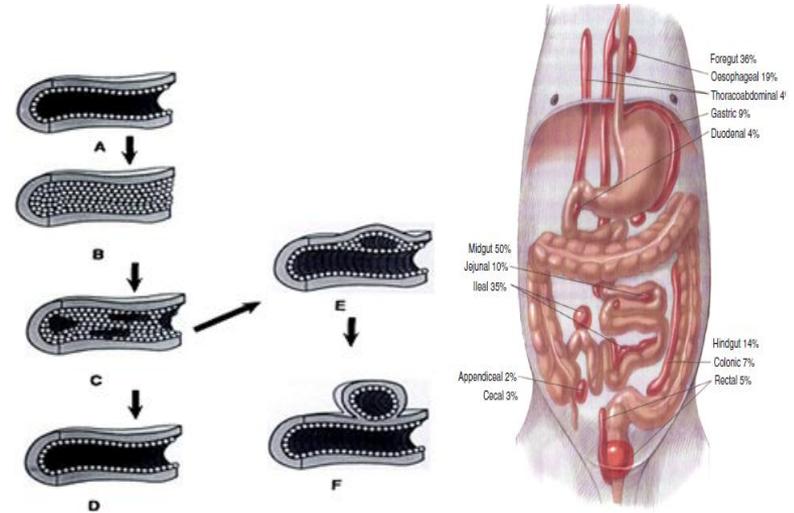

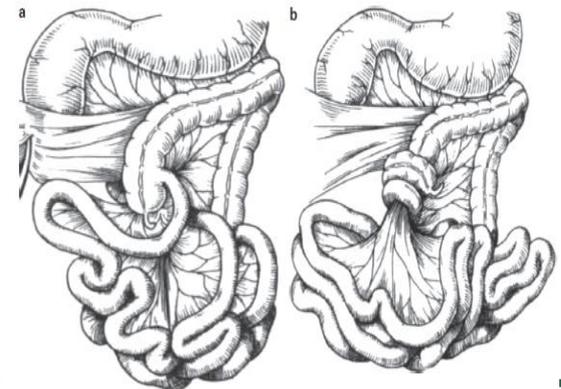Louw J.H., Barnar C.N.(1955), The Lance, 19, pp 1065-1072.

PATHOPHYSIOLOGY

❖ Duplications

➢ Failure of normal regression

➢ Traction between endoderm and overlying structures

➢ Adherence of the lining endodermal walls

➢ Errors of recanalization of epithelial plugs.

❖ Malrotation: Incorrect rotation and fixation of the gut.

PATHOPHYSIOLOGY

- ➢ Neural ganglion cells originate from neural crest cells.
- ➢ Appears with the development of the esophagus
- ➢ Migration to the bottom of the anus, during the fifth to twelfth week
- ➢ Thai 6 weeks to the stomach.
- ➢ Thai 7 weeks to enter the small intestine.
- ➢ Thai 8 weeks to colon
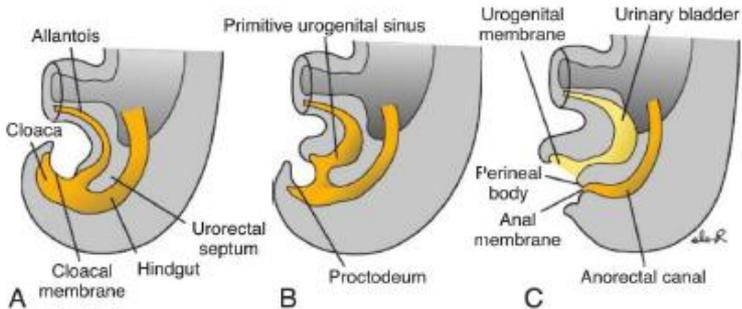- ➢ Thai 12 weeks to rectum.
- ➢ Completed at 24 weeks
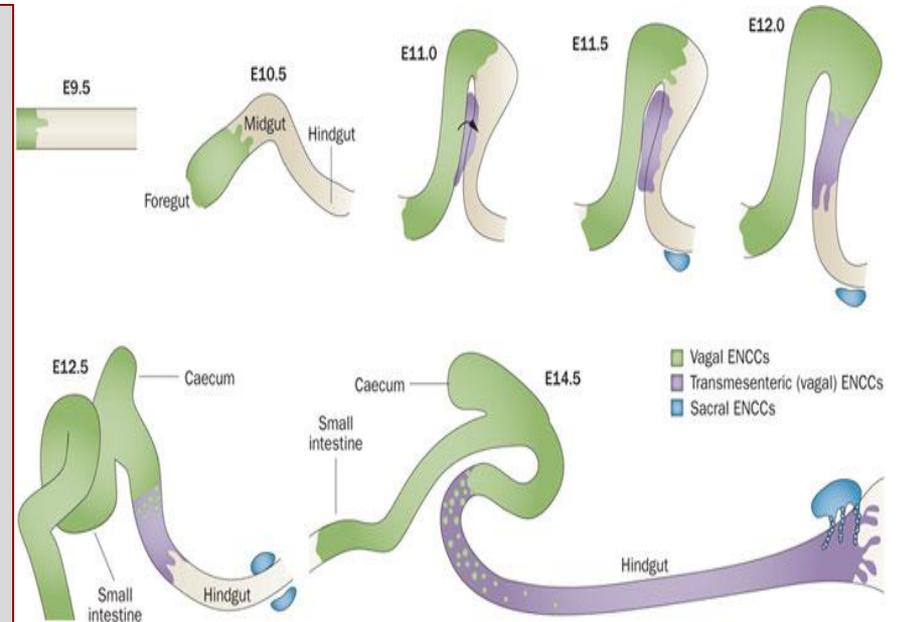
❖ Megacolon: the neural crest stops moving

PATHOPHYSIOLOGY

❖ **Anorectal malformation**

➤ Imperforate anus: Anal Membrane is not torn in the 9th week

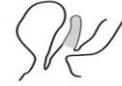➤ Abnormal development of the urorectal septum

OBJECTIVES AND METHODOLOGY

❖ *Selection criteria*

➢ *Case group*: 278 children with gastrointestinal defects were diagnosed after birth based on clinical, Xray and surgical results.

➢ *Control group*: 23.322 children without birth defects.

❖ **Exclusion criteria**

➢ Newborn without prenatal ultrasound.

➢ Children were subject to abortion consultation with the prenatal diagnostic center

➢ The family refused to participate in the study

OBJECTIVES AND METHODOLOGY

❖ **Place and time**

➢ National Hospital of Obstetric and Gynecology .

➢ From 1 January 2011 to 30 June 2015.

❖ **Research design**: Descriptive, prospective, comparative.

❖ **Data collection**: according to the common medical form

❖ **Data processing**

➢ SPSS 20.0 and STACAL.EXE

➢ Calculate Se, Sp, PPV, NPV

POLYHYDRAMIC DIAGNOSIS

Divide into 3 levels

❖ The deepest corners

   - Light 8 - 11 cm,

   - Medium 12 - 15 cm,

   - Heavy> 16 cm.

❖ AFI (Amniotic Fluid Index)

   - Light 25 - 30 cm

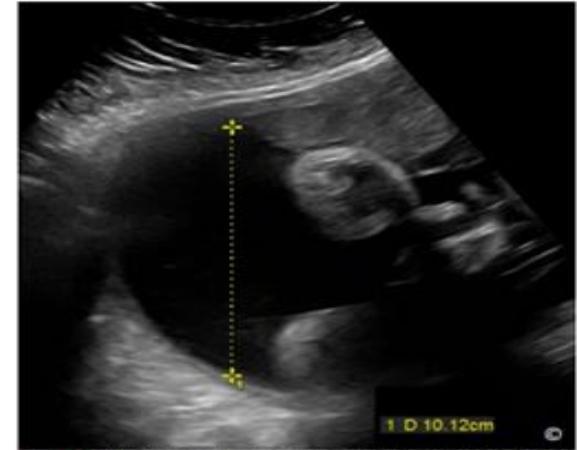   - Medium 30.1 - 35 cm

   - Heavy> 35.1cm

Figure 9.6: Polyhydramnios diagnosed by the Maximal Vertical Pocket (MVP) method. Note that the MVP measured 10.1 cm in this pregnancy.
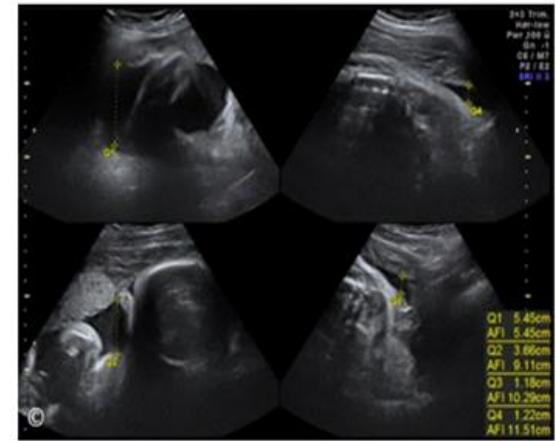
Figure 9.3: Measurement of amniotic fluid using the Amniotic Fluid Index (AFI) technique in a pregnancy with normal fluid. Note the measurements in four quadrants (Q) of the uterine cavity. AFI is determined by adding the four-quadrant measurements (normal range at 11.5 cm). See text for details.

Prenatal ultrasound diagnoses

- ❖ Esophageal atresia
- ➤ Gastric shape small or unseen
- ➤ Polyhydramnios
- ➤ Esophagus pouch
- ➤ *Combination of three signs: predictive value of 60-100% and sensitivity of 80-100%*
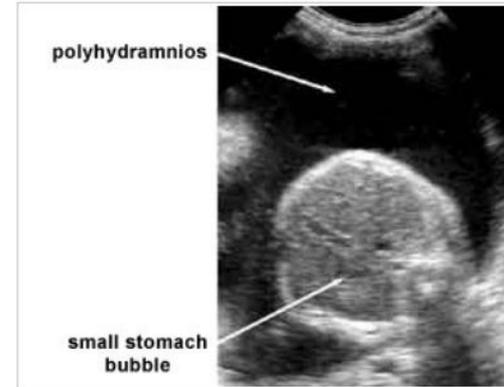
Prenatal ultrasound diagnoses

❖ *Duodenal atresia*

➢ Image of "double bubble" , *Clear when pregnancy> 20 weeks*
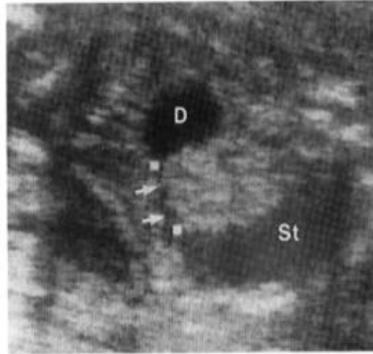
Figure 7-4. Oblique scan shows the stomach connected *(arrows)* with a dilated duodenal bulb through the pylorus. D, duodenum; St, stomach.

Figure 5.35: Transverse plane of the abdomen in a fetus with duodenal atresia. Note the enlarged stomach that crosses the midline (dashed line) and is shaped in a double bubble (asterisks). S = spine.
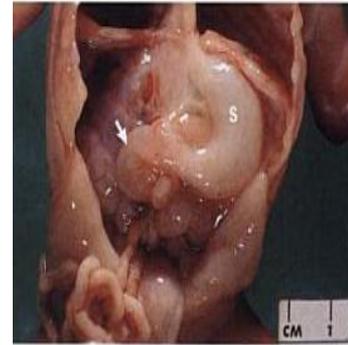
❖*Intestinal atresia*

➢ dilated bowel loops, diameter > 7 mm, length > 15 mm*,*
➢ *Colon dilatation> 23 mm*

ileal atresia
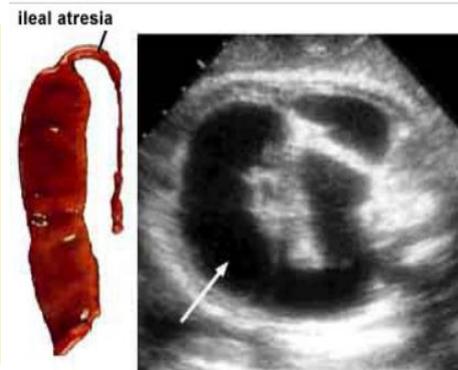
Prenatal ultrasound diagnoses

❖ Malrotation

➢ *Large intestinal enlargement of coffee beans, non-peritoneal thick wall*

➢ *Many smaller, smaller intestines are around.*

➢ *Color Doppler ultrasound can see the "whirlpool sign"*

Prenatal ultrasound diagnoses

❖ *Meconium peritonitis*

➢ *Type 1. massive meconium ascites*

➢ *Type 2. giant pseudocyst.*

➢ *Type 3. Synthesis: Calcium or small pseudocyst.*

➢ *Other signs: polyhydramnios, large intestines*

Echogenic bowel

Meconium peritonitis
18 weeks — ascites
26 weeks — meconium pseudocyst
30 weeks — intestinal obstruction

❖Ultrasound has 4 levels

➢Grade 0: only calcifications in the abdomen.

➢Grade 1: calcification and ascites or pseudocyst or large intestines

➢Grade 2: There are two pictures.

➢Grade 3: Have all the pictures
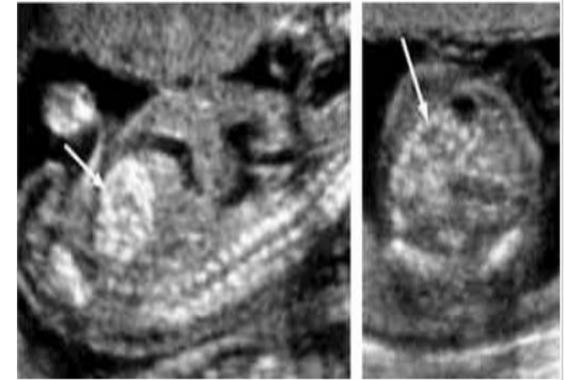
Neonatal surgical interventions: 0% at 0, 52% at 1, 80% at 2 and 100% at 3

Prenatal ultrasound diagnoses

- ❖ *Anorectal malformation*
- ➢ Prenatal utrasound had V- or U-shaped expanded colon
- ➢ large intestines
- ➢ *Imperforate anus: rectum dilated, intestinal calcium, the anal sphincter unseen*
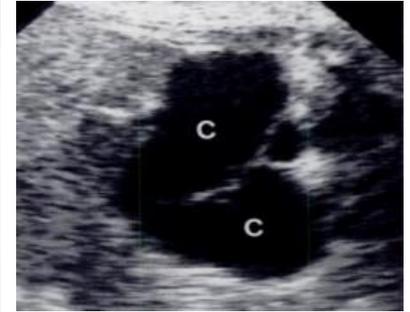

Figure 3: The anal complex can be seen between the pelvic bones at the tip of the arrow. There is a hypoechoic ring, which is the muscular portion surrounding the hyperechoic mucosa and the central hypoechoic area being the lumen of the anus. This may be seen from 15 weeks on to term, but may not be seen well until after 20 weeks of gestation.

RESULTS AND DISCUSSION

Distribution by sex, gestational age, weight

General features		n	Tỷ lệ %	p
Sex	Male	157	57,2	> 0,05
	Female	119	42,8	
Gestational age (week)	< 37	173	62,2	< 0,05
	37-41	104	37,4	
	≥ 42	1	0,4	
Weight (gam)	<1500	27	9,7	<0,05
	1500-<2000	57	20,7	
	2000-<2500	77	27,7	
	≥ 2500	117	42,1	
Total		278	100	

The value of the Polyhydramnios sign

Polyhydramnios	Gastrointestinal tract malformations		Total
	Yes	No	
Yes	148	142	290
No	130	23180	23310
Total	278	23322	23600

Se= 53,2%   *PPV= 51,0%*

Sp= 99,4%   *NPV= 99,4%*

Distribution Cases Follow amniotic

Legend:
- Normal amniotic
- Polyhydramnios
- Oligohydramnios

Values shown: 3,6 · 43,2 · 53,2
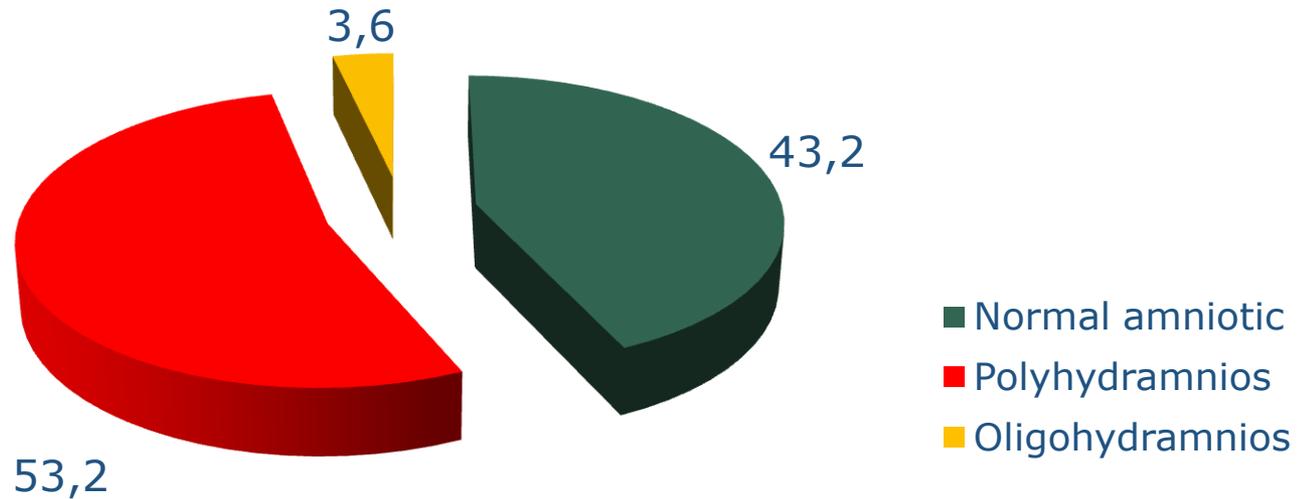
Dashe JS (2002) 62%
Huỳnh Thị Duy Hương (2012) 8,75%

Rate of gastrointestinal abnormalities based on signs of amniotic fluid

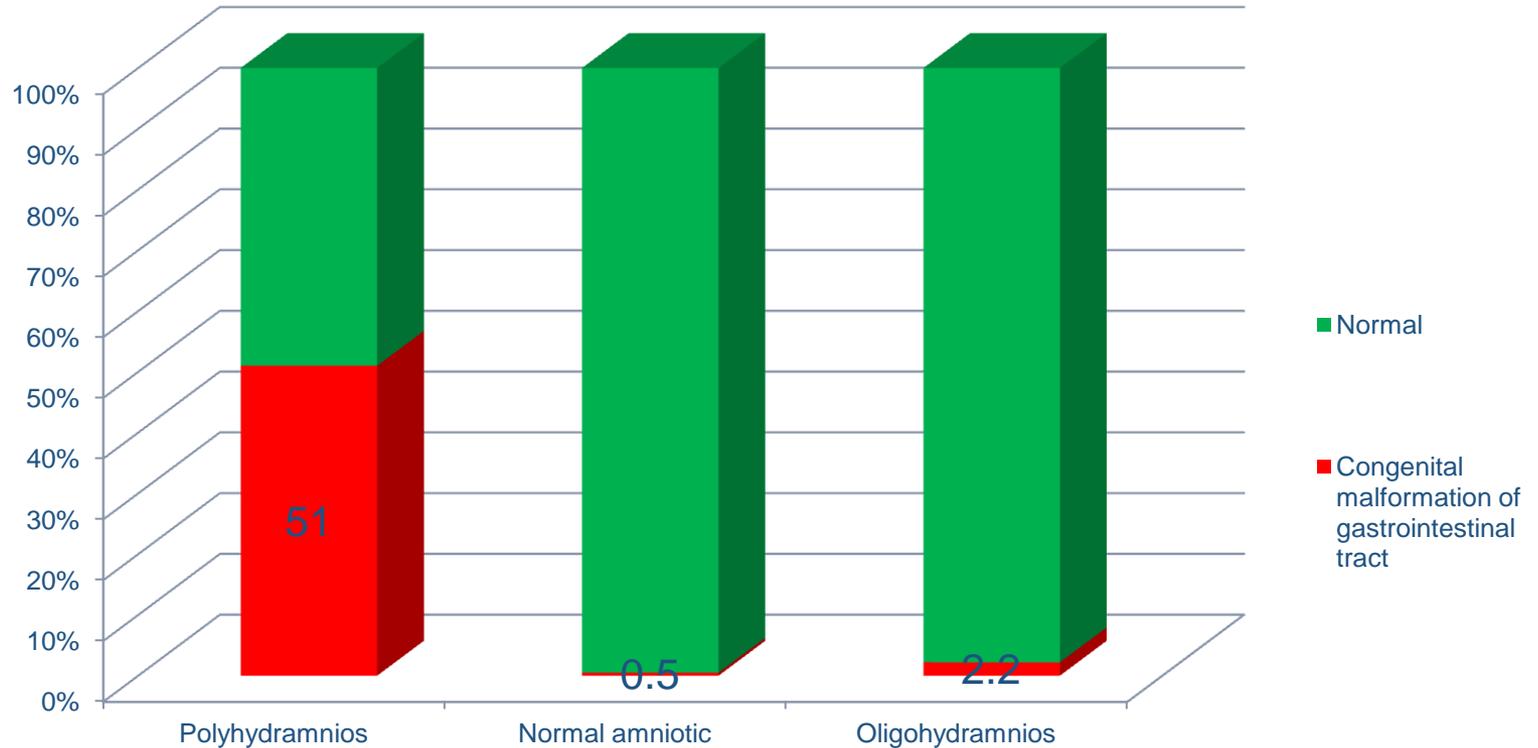*James (1958) 17.615 deliveries, 0,4% hydramnios; 43,4% abnormal, 12,1% obstruction, 36,4% Stillborn, 21,2% C.N.S, 27,3% Loop of cord*

The value of polyhydramnios for each type of malformation

| US | Polyhydramnios | | | | Value(%) | | | |
| | Case | | Control | | | | | |
GI	Yes	No	Yes	No	Se	Sp	PPV	NPV
EA	36	14	254	23.296	72	98,9	12,4	99,9
DA	50	11	240	23.299	82	99	17,2	100
IA	35	34	255	23.279	50,7	98,9	12,1	99,9
MP	22	20	268	23.290	52,4	98,8	7,6	99,9
AM	14	51	276	23.259	21,5	98,8	4,8	99,8
Mega	0	5	-	-	0	-	-	-

US: Ultrasound, GI: Gastrointestinal, EA:Esophageal atresia, DA:Duodenal atresia, IO:Intestinal obstruction, MP: Meconium peritonitis, AM: Anorectal *malformation* Mega: Megacolon

EA: Kunisaki SM (2014) 73%. Mimi C. Berman (1997), 76%, 8%. DA: A.Brantberg (2002) 83%
MP: S. Ionescu (2015) 25-50 %

CONCLUSION

Polyhydramnios sign

- ➤ Diagnosis of gastrointestinal malformations: Se 53.2%, Sp 99.4%, PPV 51%, NPV 9.4%.
- ➤ Valuable in diagnosis: Esophageal atresia Se 72%, duodenal atresia Se 82%.
- ➤ Less valuable in the diagnosis of megacolon disease and anorectal malformation.

THANK YOU