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Endoscopy in Pregnancy

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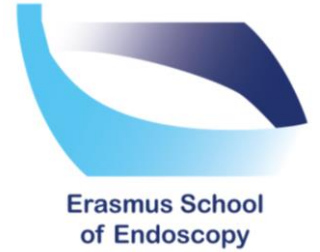
Case

- 27 year old female
- 24 wk gestational age

- Biliary colic's, opioid dependent
- SIRS negative
- Abnormal LFT, increased bilirubin level
- Abdominal ultrasound: suspicion of choledocholithiasis

- *ERCP?*

Endoscopy and Pregnancy



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2. Is there an optimal time window for endoscopy during pregnancy?

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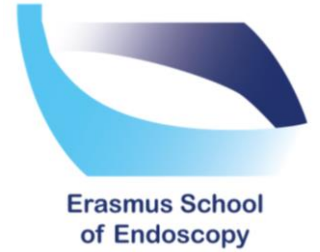
Endoscopy and Pregnancy



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Why could there be an increased risk?

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Fetus: sensitive to maternal hypoxia and hypotension

- Maternal over sedation: hypoventilation or hypotension
- Maternal positioning: inferior vena cava compression by gravid uterus
- Teratogenesis (medication or ionizing radiation exposure)
- Premature birth

Mother: risk of aspiration

- Lower LES pressure spanning oiv progesteron en oestrogeen
- Stomach positioned more horizontally
- Delayed gastric emptying

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Safety of Endoscopy during Pregnancy

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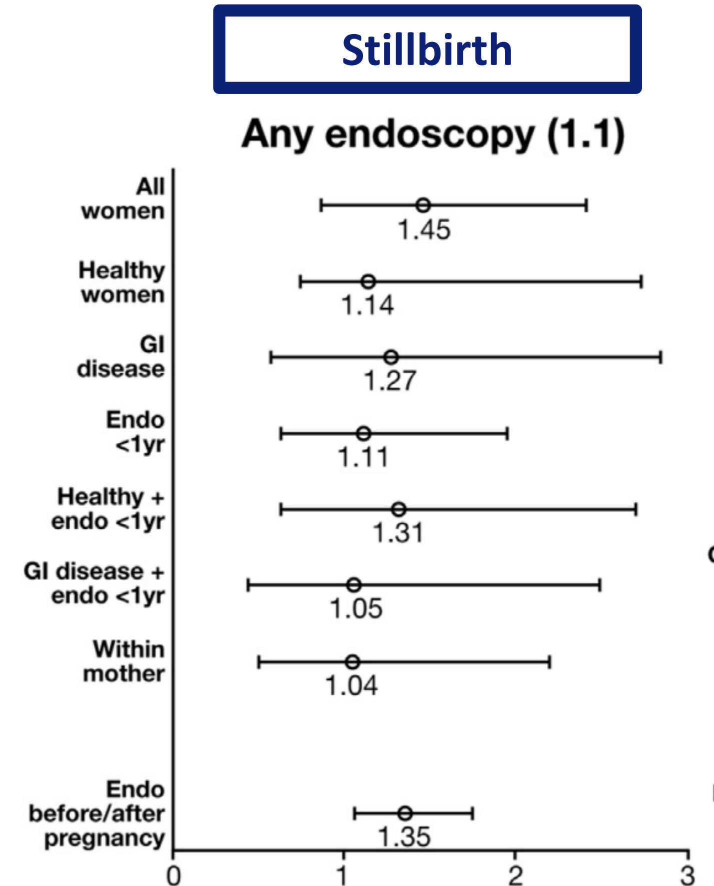
- Swedish population-based cohort study
- 3052 pregnancies exposed to endoscopy
  - 2025 UGI endoscopies
  - 1109 LGI endoscopies
  - 58 ERCPs
- Controls: non exposed pregnancies
- ARR: stillbirth, SGA and preterm birth



Ludvigsson et al. Gastroenterology 2017

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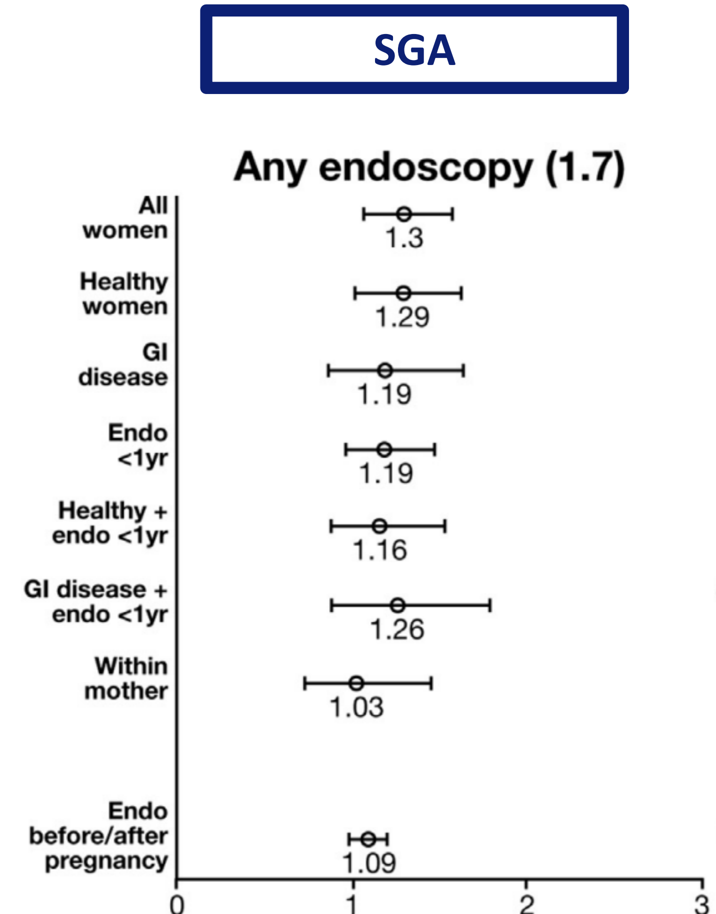
SGA



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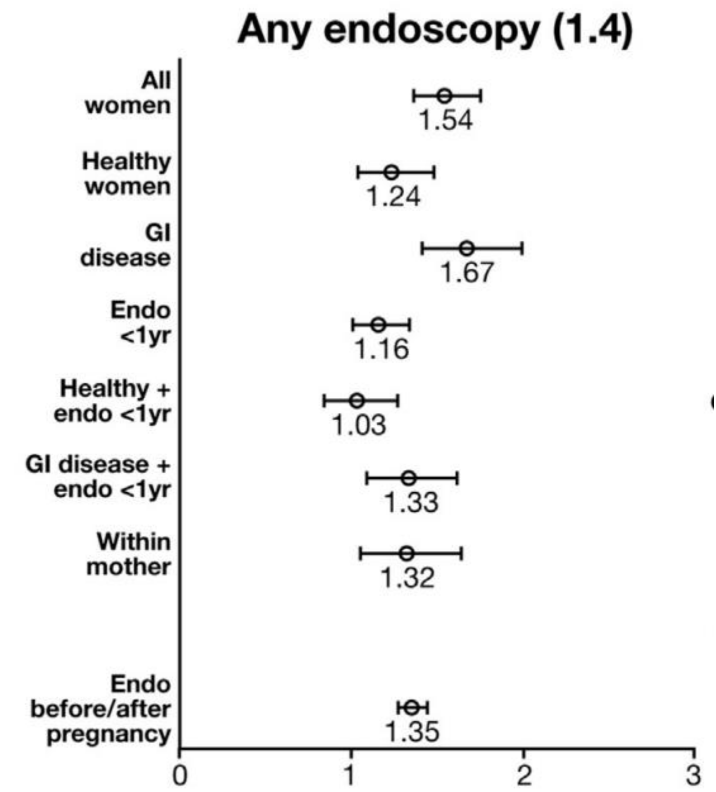
Preterm Birth



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Safety of Endoscopy during Pregnancy

Preterm Birth

	Any endoscopy (1.4)	Upper endoscopy (1.5)	Lower endoscopy (1.6)
All women	1.54	1.54	1.94
Healthy women	1.24	1.27	1.1
GI disease	1.67	2.03	2.09
Endo <1yr	1.16	1	1.5
Healthy + endo <1yr	1.03	1.06	1
GI disease + endo <1yr	1.33	1.43	1.61
Within mother	1.32	1.05	1.65
Endo before/after pregnancy	1.35	1.21	1.49

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Conclusions:

Increased risk of preterm birth and SGA

No increased risk of congenital malformation or stillbirth

Risks are small and likely due to disease activity

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Safety of ERCP during Pregnancy

- Retrospective matched-cohort study
- 907 pregnancies with ERCP
- Controls: 2721 non pregnant ERCP
- Complications:
  PEP, bleeding, perforation

Table 4. Complications Among Pregnant Women Undergoing ERCP

	Pregnant (n = 907), %	National estimates, %	P value
Maternal–fetal complications			
Maternal mortality	0	0.028	.3171
Fetal loss	IS	0.65	.8613
Fetal distress/ complication	IS	0.2	.0737
Preterm labor	1.87	11.5	<.0001

		Not pregnant (n = 2721), %	
ERCP-related complications			
Post-ERCP pancreatitis	12.13	5.15	<.0001
ERCP-associated hemorrhage	IS	0.96	.0673[a]
Perforation	IS	IS	.4141[a]
Cholecystitis	IS	IS	.0075[a]
Death	0.00	IS	.3171[a]

Indamar et al. Gastroenterology 2016

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Have a Strong Indication!

- Consider:
  - *Is there an alternative non endoscopic management?*
  - *If not, can the timing of endoscopy be postponed?*

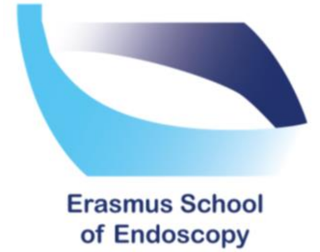
- Justified when it is clear that failure to perform the procedure could expose the fetus and/or mother to harm

- Obtain informed consent:
  - *Risks to the fetus as well as to the mother*

TABLE 2. Indications for endoscopy in pregnancy
Significant or continued GI bleeding
Severe or refractory nausea and vomiting or abdominal pain
Dysphagia or odynophagia
Strong suspicion of colon mass
Severe diarrhea with negative evaluation
Biliary pancreatitis, symptomatic choledocholithiasis, or cholangitis
Biliary or pancreatic ductal injury

ASGE Guideline 2012

Endoscopy and Pregnacy



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Optimal Time Window for Endoscopy

Traditionally:

If possible, perform endoscopy in 2nd trimester

- *1st trimester: organogenesis*
- *3rd trimester: volume*

TRIMESTER	MONTH	WEEK
1st	one	1 - 4
	two	5 - 8
	three	9 - 13
2nd	four	14 - 17
	five	18 - 22
	six	23 - 27
3rd	seven	28 - 31
	eight	32 - 35
	nine	36 - 40

Optimal Time Window for Endoscopy

Traditionally:

If possible, perform endoscopy in 2nd trimester

- *1st trimester: organogenesis*
- *3rd trimester: volume*

However, no differences in outcome of pregnancy between trimesters

- Ludvigsson et al. 2017
- De Lima et al. 2015

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	five	18 - 22
	six	23 - 27
3rd	seven	28 - 31
	eight	32 - 35
	nine	36 - 40

Optimal Time Window for Endoscopy

- Urgent endoscopy:

  in every trimester

- Semi-elective endoscopy:

  preferably in second trimester

- Elective procedure:

  after delivery

TRIMESTER	MONTH	WEEK
1st	one	1 - 4
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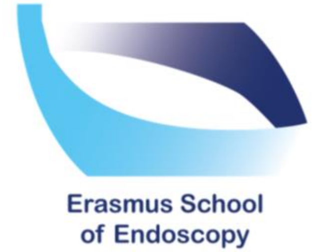

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3. ***Are there procedural considerations for endoscopy during pregnancy?***

   - Drugs

   - Sedation

   - Endoscopy specific interventions

General procedural considerations: drugs

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TABLE 4. U.S. Food and Drug Administration categories for drugs used in pregnancy

Category	Description
A	Adequate, well-controlled studies in pregnant women have not shown an increased risk of fetal abnormalities.
B	Animal studies have revealed no evidence of harm to the fetus; however, there are no adequate and well-controlled studies in pregnant women. **or** Animal studies have shown an adverse effect, but adequate and well-controlled studies in pregnant women have failed to demonstrate a risk to the fetus.
C	Animal studies have shown an adverse effect, and there are no adequate and well-controlled studies in pregnant women. **or** No animal studies have been conducted, and there are no adequate and well-controlled studies in pregnant women.
D	Adequate, well-controlled, or observational studies in pregnant women have demonstrated a risk to the fetus. However, the benefits of therapy may outweigh the potential risk.
X	Adequate, well-controlled, or observational studies in animals or pregnant women have demonstrated positive evidence of fetal abnormalities. The use of the product is contraindicated in women who are, or may become, pregnant.

- There are no category A drugs used for endoscopy
- For endoscopic procedures category B, and when necessary category C are recommended
- Category D drugs may be used when benefits outweigh risks
- Categories of limited use in determining safety due to one-time use

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Sedation and Endoscopy

General rules:

1. Titrate gently administered level of anesthetic drugs, lowest effective dose

- Increased risk of aspiration and potentially difficult airway
  ` (swelling oropharyngeal tissue, decreased caliber of glottic opening)
- Hypoventilation and hypotension

2. Consultation with an obstetrician

- Consider fetal heartbeat monitoring, > 24-26 wks GA
- Support in case of pregnancy related complications

Moderate Sedation and Endoscopy

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For most procedures, the level of sedation should be anxiolysis or moderate sedation

- ✓ Midazolam
- ✓ Fentanyl
- ✓ Lidocaine spray

Table 4 Drugs in pregnancy and breast feeding

Agent	Pregnancy	Breast feeding
Local anaesthetic throat spray	Compatible for use	Compatible for use
Nitrous oxide	Compatible for use	Compatible for use
Hyoscine	Single dose probably safe if needed	Compatible for use
Benzodiazepines	Diazepam to be avoided Midazolam can be used for procedural sedation	Breast feeding can continue when mother alert and awake
Opioids	Compatible for use	Breast feeding can continue when mother awake and alert
Propofol	Compatible for use	Breast feeding can continue when mother alert and awake

Sidhu et al. Gut 2024

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- ✓ Flumazenil
- ✓ Naloxon

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Deep Sedation and Endoscopy

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Deep sedation for patients who are difficult to sedate, and/or therapeutic endoscopy

- ✓ Propofol
- ✓ Ketamine

Deep sedation or general anesthesia?

- No difference found on safety in pregnant patients undergoing diagnostic of minimally invasive procedures
- Decision per case based on type of procedure, and patient specific risk factors

Conceptrichtlijn Anesthesie tijdens de zwangerschap januari 2024

Monitoring of the Fetus

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Rationale

- Early intervention in case of detoriation of fetal condition

When?

- Expected changes in maternal hemodynamics
- From 24-26 weeks of gestational age

How?

- Pre, post endoscopy or intermittent registration of heart sounds
- Continuous monitoring with CTG
- Measure uterine contractions

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Colonoscopy: Specific Considerations

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Preparation:

- PEG based bowel preparation is safe
- Sodium phosphate contraindicated (fluid overload)

Positioning the patient:

- Not in supine position in second and third trimester
- Left lateral position, also after endoscopy when in recovery room!
- Consider to place a wedge or pillow under the patients hip

Procedure:

- External compression allowed (mild force and direct it away from the uterus)

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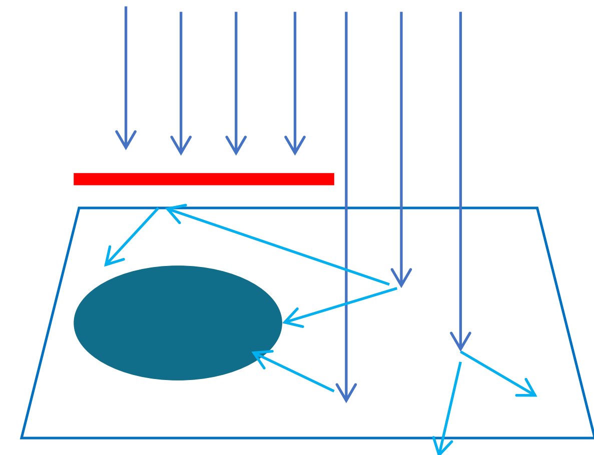
ERCP: Specific Considerations

Radiation protection:

- External shielding with lead paced under/above the pelvis and lower abdomen
- However majority of radiation scatter occurs within the pregnant patient



Minimize amount of radiation:

- Collimate the beam of area of interest
- Use brief snapshots
- Avoid taking hard copy x- ray films, these involve greater amounts of radiation

Electrocautery and Bleeding Interventions

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Electrocautery:

- Uterus not in between direction of current from catheter to grounding pad
- Preferably bipolar electrocautery
- Regular sphincterotomy is safe
- Postpone elective polypectomy

Injection therapy bleeding site:

- Adrenalin class C drug; safe
- Histoacryl-lipiodol class C drug; safe?
- Combine with bipolar therapy

Back to our Case

- 27 year old female
- 24 wk gestational age

- EUS under deep sedation
- Confirmation of cholecholithiasis
- ERCP with sphincterotomy and stone extraction

- No post ERCP pancreatitis
- Uncomplicated a term delivery

Take home messages

- Endoscopy is justified when it is clear that failure to perform the procedure could expose the fetus and/or mother to harm

- Endoscopy is generally safe during pregnancy
  - ➢ *Have a good indication, semi-elective endoscopy in second trimester*
  - ➢ *Consultation from an obstetrician*
  - ➢ *Consultation from an anesthesiologist*

- Periprocedural considerations
  - ✓ *Sedation*
  - ✓ *Fetal monitoring*
  - ✓ *Positioning of patient, Minimize radiation exposure, Electrocautery*

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