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Endoscopy in Pregnancy: Risks Versus Benefits

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Endoscopy in pregnant patients presents unique concerns regarding the safety and benefit of this procedure to the fetus. Every year in America >12,000 pregnant women have a strong indication for esophagogastroduodenoscopy (EGD), >6,000 for sigmoidoscopy or colonoscopy, and ~1,000 for therapeutic endoscopic retrograde cholangiopancreatography (ERCP).^[1]

The theoretical risks to the fetus from endoscopy are numerous. Particularly during organogenesis in the first trimester, the fetus is susceptible to the potentially teratogenic medications used in various endoscopic procedures. Further trauma to the fetus could be caused by placental abruption from endoscopic intubation, as well as by deleterious effects from transient intraprocedural maternal hypotension, hypoxia or cardiac arrhythmias. A further threat is posed by radiation exposure during ERCP, electrical injury during endoscopic electrocautery or electrocoagulation, and potential uterine hypoperfusion during epinephrine injection for hemostasis. Fetal toxicity from endoscopy can manifest itself at any time from the initial procedure to later in childhood. Manifestations might include premature delivery, stillbirth, low birth weight, neonatal illness, congenital malformations, or neurodevelopmental deficits.

In contrast, endoscopy during pregnancy might be particularly beneficial. Firstly, empirically prescribing gastrointestinal drugs during pregnancy is undesirable because of potential medication teratogenesis. Secondly, alternative diagnostic testing by barium radiography is contraindicated because of radiation teratogenesis. Thirdly, the fetus poorly tolerates maternal hypotension from gastrointestinal bleeding or maternal ascending cholangitis from choledocholithiasis, both of which conditions are treatable by endoscopic therapy. Finally, the alternative therapy of gastrointestinal surgery for severe active bleeding or complicated choledocholithiasis is undesirable because of the risk of fetal death.

The current knowledge of endoscopic safety during pregnancy is, however, limited and incomplete. The largest and most detailed published endoscopic study did not detect any increased risk from EGD among 83 pregnant patients compared with a control group of pregnant patients, matched for endoscopic indications, who did not undergo EGD.^[2] Despite the fairly large size of the study, it had insufficient power to exclude a small, but clinically important, fetal risk from endoscopy. Moreover, like all published studies investigating endoscopy during pregnancy, this study was retrospective and the selection of controls was not randomized. The absence of prospective, randomized endoscopic trials is attributable to the reluctance of physicians to conduct, and patients to enroll in, such studies during pregnancy.

Similarly, studies on teratogenicity of endoscopic medications are largely retrospective, small, often uncontrolled or not statistically analyzed, and lack long-term follow-up data.^[3] Neurodevelopmental or cytologic congenital abnormalities might not manifest until late childhood, as occurred in patients with vaginal adenocarcinoma, which developed after *in utero* diethylstilbestrol exposure.^[4] Furthermore, clinical studies typically fail to stratify drug effects according to multiple parameters that affect drug teratogenicity, such as duration of drug treatment or overall maternal illness.^[5]

Nonetheless, existing data provide estimates of endoscopic and medication risk.^[2,6,7] The report by Qureshi *et al.*^[8] provides guidance to the clinician faced with a pregnant patient with a gastrointestinal condition that would normally require endoscopy in a nonpregnant patient. These guidelines, endorsed by the American Society for Gastrointestinal Endoscopy, provide multiple benefits. They help the endoscopic physician make a judicious decision about recommending endoscopy during pregnancy, and help the pregnant patient make an informed decision about undergoing the procedure. Furthermore, these recommendations,^[8] in addition to the earlier recommendations by Cappell,^[1] might help reduce the risks of endoscopy by encouraging fetal and maternal assessment and stabilization before endoscopy, replacement of potentially teratogenic endoscopic medications by safer medications, fetal and

maternal monitoring during endoscopy, and the evaluation of fetal safety of endoscopic therapy. Other helpful recommendations include the use of the smallest effective dose of sedative and analgesic medications to minimize teratogenic risks, postponement of endoscopy to the second trimester whenever possible, placement of the patient in the lateral decubitus position to avoid vena caval or aortic compression by the gravid uterus, and application of bipolar current for electrocoagulation, to minimize stray current through the uterus.^[1,8] Malpractice judgments can be astronomically large in cases of poor fetal outcomes.^[9] Promulgation of endoscopic guidelines during pregnancy can prevent unnecessary litigation by encouraging physician adherence to normative standards with avoidance of excessive risks, and can provide normative criteria to evaluate potential deviation from standard care.

Even though Qureshi *et al.*'s published guidelines are based on careful analysis by a committee of experts they are subject to revision because of the incompleteness and limitations of the current data.^[8] In particular, despite the report's conclusion that "EGD and colonoscopy are generally safe during pregnancy", the clinician should realize that the data supporting this conclusion regarding colonoscopy is very tentative, as merely 15 cases of colonoscopy have been reported during pregnancy,^[1] with the largest study consisting of only eight cases.^[6] Moreover, the theoretical fetal risks of colonoscopy during pregnancy seem to be greater than that of flexible sigmoidoscopy or EGD, owing to longer procedure time, deeper patient sedation and greater potential for fetal compression or uterine trauma because of deeper intubation during colonoscopy.

Adherence to these guidelines does not guarantee a good pregnancy outcome; rather it offers a well-considered and judicious approach to optimizing patient care and fetal outcome in patients undergoing these procedures. Even the expectant mother without underlying comorbidities is subject to the baseline fetal risk, namely the 2-3% incidence of major congenital malformations that exists in the general population.^[10]

In adopting these guidelines, physicians should individualize decisions on endoscopy based upon his or her training and experience. When strongly indicated, gastrointestinal endoscopy can be performed during pregnancy by a well-trained endoscopist. An appropriately equipped endoscopy suite with post-procedure monitoring is essential to carry out the procedure as safely and effectively as possible. Patients should be without evidence of obstetric complications and properly informed and written patient consent should be ensured, as should maternal stabilization before endoscopy. Obstetric and anesthesiologic evaluation is desirable before endoscopy. Strong indications for endoscopy include gastrointestinal bleeding, severe and refractory nausea and vomiting, abdominal pain, dysphagia, strongly suspected colonic mass, severe diarrhea of undetermined etiology and gallstone disease complicated by biliary pancreatitis, ascending cholangitis, or otherwise symptomatic choledocholithiasis.

Future investigations for the treatment and diagnosis of gastrointestinal conditions in pregnant women should consider potential alternatives to conventional endoscopy, for example capsule endoscopy, magnetic resonance cholangiopancreatography and magnetic resonance virtual colonoscopy.^[1] At the present time, however, the guidelines outlined in the report by Qureshi *et al.*^[8] will help maximize the efficacy and safety of endoscopic procedures in pregnant women. Just as for any ordinary patient, the benefits of endoscopy should exceed the risks for the expectant mother, and should thereby benefit the fetus.

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