

# COMMENT & CONTROVERSY

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“Averting adhesions: Surgical techniques and tools,”  
by Togas Tulandi, MD, MHCM, and  
Mohammed Al-Sunaidi, MD (May)

## Peritoneal closure at C-section reduces the risk of adhesions

Even as Drs. Tulandi and Al-Sunaidi focus on ways to prevent adhesions, they assert that peritoneal closure is unnecessary. I disagree. The peritoneum is there for a reason: to separate the abdominal contents from the muscles and fascia. There are studies reporting more adhesions with closure, and studies reporting the opposite. Yet I have, on numerous occasions, entered directly into the amniotic sac while trying to separate the rectus muscles during repeat C-section. How did the uterine muscle become incorporated into the rectus muscles, with no plane of separation?

I had a patient who developed suprapubic pain and dyspareunia after her first C-section 4 years ago. At her second cesarean delivery 2 years later, her obstetrician informed her that there were terrible adhesions between the uterus and anterior abdominal wall. After the second C-section, the patient's suprapubic pain and dyspareunia worsened, and she suffered for 2 years before coming to me. When I performed diagnostic laparoscopy, I found the uterus suspended from the anterior abdominal wall by a broad, thick, fibromuscular band that was inseparable from the rectus muscles. In another repeat C-section, I found colon adherent to the rectus muscles by a thick band of dense tissue.

Adhesions like these put the patient at significant risk for operative complications. Am I the only ObGyn seeing such complications? Are others just ignoring the problem? Are we really doing the patient a favor when we save operative time by leaving the peritoneum open? There are claims that patients experience less postoperative pain without peritoneal closure, but I have not noticed this effect among my patients.

I prefer to perform repeat C-section when a woman had her peritoneum closed the first time around. There are usually no adhesions in these cases, or only thin, filmy adhesions of no consequence.

**Caleb Liem, MD**  
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## Dr. Tulandi responds: Question of closure remains unsettled

Dr. Al-Sunaidi and I appreciate Dr. Liem's interest in our article and thank him for sharing his observations. Dr. Liem is correct that studies evaluating adhesion formation after closure of the peritoneum (versus nonclosure) have yielded mixed results. For example, in a non-randomized study, Lyell and colleagues<sup>1</sup> found closure of parietal peritoneum at cesarean delivery to be associated with less adhesion formation than nonclosure. Although these investigators excluded cases involving permanent sutures, they did not describe the type of sutures used to close the peritoneum. It is known that reactive suture materials such as catgut predispose to adhesions.

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**“Are we really doing the patient a favor when we save operative time by leaving the peritoneum open?”**



On the other hand, studies of closure of both parietal and visceral peritoneum at cesarean delivery suggest that peritoneal nonclosure does not promote, and might even decrease, adhesion formation.<sup>2-4</sup> A review of nine randomized trials found less postoperative fever and a reduced hospital stay when visceral peritoneum or both visceral and parietal peritoneum were left unsutured.<sup>5</sup> Investigators concluded that there is no evidence to justify the time and expense of peritoneal closure. Peritoneal closure is also associated with more postoperative pain.

A large randomized trial evaluating adhesion formation after cesarean section with second-look laparoscopy would help us answer the question of whether one should suture the peritoneum at cesarean section.

## References

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double-blind, multicenter study, the overall safety and tolerability profiles of once weekly FOSAMAX 70 mg (n=519) and FOSAMAX 10 mg daily (n=370) were similar. The adverse experiences considered by the investigators as possibly, probably, or definitely drug related in ≥1% of patients in either treatment group were *Gastrointestinal*: abdominal pain 3.7% and 3.0%, dyspepsia 2.7% and 2.2%, acid regurgitation 1.9% and 2.4%, nausea 1.9% and 2.4%, abdominal distention 1.0% and 1.4%, constipation 0.8% and 1.6%, flatulence 0.4% and 1.6%, gastritis 0.2% and 1.1%, gastric ulcer 0.0% and 1.1%; *Musculoskeletal*: musculoskeletal (bone, muscle, joint) pain 2.9% and 3.2%, muscle cramp 0.2% and 1.1%, respectively. *Men*—In two placebo-controlled, double-blind, multicenter studies in men (a two-year study of FOSAMAX 10 mg/day and a one-year study of once weekly FOSAMAX 70 mg) the rates of discontinuation of therapy due to any clinical adverse experience were 2.7% for FOSAMAX 10 mg/day (n=146) vs. 10.5% for placebo (n=95), and 6.4% for once weekly FOSAMAX 70 mg (n=109) vs. 8.6% for placebo (n=58). The adverse experiences considered by the investigators as possibly, probably, or definitely drug related in ≥2% of patients treated with either FOSAMAX or placebo for the two-year study were *Gastrointestinal*: acid regurgitation 4.1% and 3.2%, flatulence 4.1% and 1.1%, gastroesophageal reflux disease 0.7% and 3.2%, dyspepsia 3.4% and 0.0%, diarrhea 1.4% and 1.1%, abdominal pain 2.1% and 1.1%, nausea 2.1% and 0.0%, respectively; for the one-year study, the adverse experiences were *Gastrointestinal*: acid regurgitation 0.0% and 0.0%, flatulence 0.0% and 0.0%, gastroesophageal reflux disease 2.8% and 0.0%, dyspepsia 2.8% and 1.7%, diarrhea 2.8% and 0.0%, abdominal pain 0.9% and 3.4%, nausea 0.0% and 0.0%, respectively. *Prevention of osteoporosis in postmenopausal women*: The safety of FOSAMAX 5 mg/day in postmenopausal women 40-60 years of age has been evaluated in three double-blind, placebo-controlled studies involving over 1,400 patients randomized to receive FOSAMAX for either two or three years. In these studies the overall safety profiles of FOSAMAX 5 mg/day and placebo were similar. Discontinuation of therapy due to any clinical adverse experience occurred in 7.5% of 642 patients treated with FOSAMAX 5 mg/day and 5.7% of 648 patients treated with placebo. The adverse experiences considered by the investigators as possibly, probably, or definitely drug related in ≥1% of patients treated with FOSAMAX 5 mg daily (n=642) or placebo (n=648) were *Gastrointestinal*: dyspepsia 1.9% and 1.4%, abdominal pain 1.7% and 3.4%, acid regurgitation 1.4% and 2.5%, nausea 1.4% and 1.4%, diarrhea 1.1% and 1.7%, constipation 0.9% and 0.5%, abdominal distention 0.2% and 0.3%; *Musculoskeletal*: musculoskeletal (bone, muscle or joint) pain 0.8% and 0.9%, respectively. In a one-year, double-blind, multicenter study, the overall safety and tolerability profiles of FOSAMAX 5 mg daily (n=361) and once weekly FOSAMAX 35 mg (n=362) were similar. The adverse experiences considered by the investigators as possibly, probably, or definitely drug related in ≥1%

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of patients in either treatment group were *Gastrointestinal*: dyspepsia 2.2% and 1.7%, abdominal pain 4.2% and 2.2%, acid regurgitation 4.2% and 4.7%, nausea 2.5% and 1.4%, diarrhea 1.1% and 0.6%, constipation 1.7% and 0.3%, abdominal distention 1.4% and 1.1%; *Musculoskeletal*: musculoskeletal (bone, muscle or joint) pain 1.9% and 2.2%, respectively. *Concomitant use with estrogen/hormone replacement therapy*: In two studies (of one and two years' duration) of postmenopausal osteoporotic women (total: n=853), the safety and tolerability profile of combined treatment with FOSAMAX 10 mg once daily and estrogen ± progestin (n=354) was consistent with those of the individual treatments. *Treatment of glucocorticoid-induced osteoporosis*: In two, one-year, placebo-controlled, double-blind, multicenter studies in patients receiving glucocorticoid treatment, the overall safety and tolerability profiles of FOSAMAX 5 and 10 mg/day were generally similar to that of placebo. The adverse experiences considered by the investigators as possibly, probably, or definitely drug related in ≥1% of patients treated with either FOSAMAX 5 mg/day (n=161) or 10 mg/day (n=157) or placebo (n=159) were *Gastrointestinal*: abdominal pain 1.9%, 3.2%, and 0.0%; acid regurgitation 1.9%, 2.5%, and 1.3%; constipation 0.6%, 1.3%, and 0.0%; melena 0.0%, 1.3%, and 0.0%; nausea 1.2%, 0.6%, and 0.6%; diarrhea 0.0%, 0.0%, and 1.3%; *Nervous System/Psychiatric*: headache 0.0%, 0.6%, and 1.3%, respectively. The overall safety and tolerability profile in the glucocorticoid-induced osteoporosis population that continued therapy for the second year of the studies (FOSAMAX: n=147) was consistent with that observed in the first year. *Paget's disease of bone*: In clinical studies (osteoporosis and Paget's disease), adverse experiences reported in 175 patients taking FOSAMAX 40 mg/day for 3-12 months were similar to those in postmenopausal women treated with FOSAMAX 10 mg/day. However, there was an apparent increased incidence of upper gastrointestinal adverse experiences in patients taking FOSAMAX 40 mg/day (17.7% FOSAMAX vs. 10.2% placebo). One case of esophagitis and two cases of gastritis resulted in discontinuation of treatment. Additionally, musculoskeletal (bone, muscle or joint) pain, which has been described in patients with Paget's disease treated with other bisphosphonates, was considered by the investigators as possibly, probably, or definitely drug related in approximately 6% of patients treated with FOSAMAX 40 mg/day versus approximately 1% of patients treated with placebo, but rarely resulted in discontinuation of therapy. Discontinuation of therapy due to any clinical adverse experience occurred in 6.4% of patients with Paget's disease treated with FOSAMAX 40 mg/day and 2.4% of patients treated with placebo. *Osteogenesis Imperfecta*: FOSAMAX is not indicated for use in children. The overall safety profile of FOSAMAX in OI patients treated for up to 24 months was generally similar to that of adults with osteoporosis treated with FOSAMAX. However, there was an increased occurrence of vomiting in OI patients treated with FOSAMAX

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compared to placebo. During the 24-month treatment period, vomiting was observed in 32 of 109 (29.4%) patients treated with FOSAMAX and 3 of 30 (10%) patients treated with placebo. In a pharmacokinetic study, 6 of 24 pediatric OI patients who received a single oral dose of FOSAMAX 35 or 70 mg developed fever, flu-like symptoms, and/or mild lymphocytopenia within 24 to 48 hours after administration. These events, lasting no more than 2 to 3 days and responding to acetaminophen, are consistent with an acute-phase response that has been reported in patients receiving bisphosphonates, including FOSAMAX. See *ADVERSE REACTIONS, Post-Marketing Experience, Body as a Whole*. **Laboratory Test Findings.** In double-blind, multicenter, controlled studies, asymptomatic, mild, and transient decreases in serum calcium and phosphate were observed in approximately 18% and 10%, respectively, of patients taking FOSAMAX versus approximately 12% and 3% of those taking placebo. However, the incidences of decreases in serum calcium to <8.0 mg/dL (2.0 mM) and serum phosphate to ≤2.0 mg/dL (0.65 mM) were similar in both treatment groups. **Post-Marketing Experience.** The following adverse reactions have been reported in post-marketing use: *Body as a Whole*: hypersensitivity reactions including urticaria and rarely angioedema. Transient symptoms of myalgia, malaise, asthenia and rarely, fever have been reported with FOSAMAX, typically in association with initiation of treatment. Rarely, symptomatic hypocalcemia has occurred, generally in association with predisposing conditions. Rarely, peripheral edema. *Gastrointestinal*: esophagitis, esophageal erosions, esophageal ulcers, rarely esophageal stricture or perforation, and oropharyngeal ulceration. Gastric or duodenal ulcers, some severe and with complications have also been reported (see *WARNINGS, PRECAUTIONS, Information for Patients, and DOSAGE AND ADMINISTRATION*). Localized osteonecrosis of the jaw, generally associated with tooth extraction and/or local infection, often with delayed healing, has been reported rarely (see *PRECAUTIONS, Dental*). *Musculoskeletal*: bone, joint, and/or muscle pain, occasionally severe, and rarely incapacitating (see *PRECAUTIONS, Musculoskeletal Pain*); joint swelling. *Nervous system*: dizziness and vertigo. *Skin*: rash (occasionally with photosensitivity), pruritus, rarely severe skin reactions, including Stevens-Johnson syndrome and toxic epidermal necrolysis. *Special Senses*: rarely uveitis, scleritis or episcleritis.

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