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CLINICAL AND DIAGNOSTIC FEATURES OF GOSSYPIBOMA MIMICKING MALIGNANT GYNECOLOGIC TUMORS

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With the purpose to analyze the clinical presentation, imaging characteristics, and diagnostic challenges of gossypiboma in gynecologic patients we conducted a retrospective single-center case series from Azerbaijan Medical University (n=10, 2017-2021) supplemented by systematic literature cases (n=10, 2020-2025) to create an enhanced dataset of 20 cases. Comprehensive statistical analysis included risk factor assessment, imaging correlation, and outcome evaluation. No statistically significant risk factors for complications were identified, though emergency surgery (OR 3.00) and prolonged surgery >3 hours (OR 5.62) showed numerically higher odds. In our actual-case level data, computed tomography imaging demonstrated characteristic spongiform appearance with gas bubbles in 85 % of cases, while magnetic resonance imaging revealed pathognomonic whorled stripes pattern in 60 %. Complications occurred in 35 % of cases, with no mortality observed. Implementation of standardized diagnostic algorithms, and adoption of modern prevention technologies are essential for reducing incidence and improving outcomes.

Key words: gossypiboma, textiloma, retained surgical sponge, gynecologic oncology, diagnostic imaging, surgical safety, prevention protocols.

Ібрагімов А.М., Амірасланов А.Т., Газієв А.Ю., Гулієва Т.С. КЛІНІКО-ДІАГНОСТИЧНІ ОСОБЛИВОСТІ ГОСПІБОМИ, ЯКА ІМІТУЄ ЗЛОЯКІСНІ ГІНЕКОЛОГІЧНІ ПУХЛИНИ

З метою аналізу клінічних проявів, візуалізаційних характеристик та діагностичних складнощів госпібому у пацієнток гінекологічного профілю ми провели ретроспективну одноцентрову серію клінічних випадків на базі Азербайджанського медичного університету (n=10, 2017–2021 рр.), доповнену випадками, виявленими в ході систематичного аналізу літератури (n=10, 2020–2025 рр.), що дозволило сформувати розширену вибірку з 20 випадків. Комплексний статистичний аналіз включав оцінку факторів ризику, порівняння результатів методів медичної візуалізації та аналіз результатів лікування. Статистично значущих факторів ризику розвитку ускладнень виявлено не було, проте екстрене хірургічне втручання (OR=3,00) та тривалість операції понад 3 години (OR=5,62) були пов'язані з вищою ймовірністю розвитку ускладнень. За даними аналізу фактичних випадків, комп'ютерна томографія у 85 % випадків демонструвала характерну губчасту структуру з бульбашками газу, тоді як під час магнітно-резонансної томографії у 60 % випадків виявлявся патогномонічний симптом у вигляді закручених смуг (whorled stripes pattern). Ускладнення спостерігалися у 35 % випадків; летальних випадків не зареєстровано. Впровадження стандартизованих діагностичних алгоритмів та сучасних технологій профілактики має важливе значення для зниження частоти виникнення госпібому та поліпшення клінічних результатів.

Ключові слова: госпібома, текстилома, залишений хірургічний матеріал, гінекологічна онкологія, діагностична візуалізація, хірургічна безпека, протоколи профілактики.

Gossypiboma, derived from the Latin “gossypium” (cotton) and Swahili “boma” (place of concealment), represents one of the most challenging complications in modern surgical practice [1]. This retained surgical foreign body, typically a cotton sponge or towel, continues to pose a significant problem in healthcare systems despite advances in surgical safety protocols and counting procedures [2, 15]. The clinical significance of gossypiboma extends far beyond its immediate physical consequences, encompassing profound medico-legal implications, patient safety concerns, and substantial healthcare costs [2, 7, 8]. In gynecologic surgery, gossypiboma presents unique diagnostic challenges due to its propensity to mimic malignant tumors, particularly ovarian and other pelvic malignancies. The anatomical complexity of the female pelvis, combined with the inflammatory response surrounding retained surgical materials, may produce clinical and imaging appearances resembling primary or recurrent neoplastic processes [4, 6, 10].

The true incidence of gossypiboma remains difficult to determine, as retained surgical sponges may remain clinically silent for months or even years and are frequently diagnosed only after the development of

symptoms or the incidental detection of a postoperative mass [2, 7, 15]. In addition, underreporting related to medico-legal concerns may contribute to an underestimation of its actual frequency. Because gossypiboma represents a preventable surgical complication with potentially serious clinical consequences, including chronic inflammatory reactions, mass formation, migration, and involvement of adjacent organs, its delayed recognition may substantially increase patient morbidity [7, 15]. These features emphasize the importance of maintaining clinical suspicion for gossypiboma in patients presenting with an unexplained abdominal or pelvic mass and a history of previous surgery.

Contemporary imaging modalities have significantly improved the recognition of gossypiboma, although differentiation from neoplastic processes may remain challenging [1, 3, 12]. Various clinical presentations have been reported, ranging from an asymptomatic or palpable abdominal mass to intestinal obstruction, transmural migration, and lesions mimicking gastrointestinal or gynecologic tumors [5, 9, 14]. In gynecologic patients, previous cesarean section, hysterectomy, adnexal surgery, and

other abdominal or pelvic procedures should therefore raise suspicion of a retained surgical foreign body when an unexplained mass is detected [4–6]. Prevention remains essential and requires standardized surgical counting procedures, effective team communication, early recognition, and prompt retrieval of retained surgical items [15].

The purpose of the study was to analyze the clinical presentation, imaging characteristics, and diagnostic challenges of gossypiboma in gynecologic patients.

Materials and methods. Study Design. This is a single-center retrospective case series supplemented by a systematic literature review. The study employed a dual-source methodology combining primary cases from a tertiary academic medical center with carefully selected literature cases. The primary study component consisted of cases identified at the Department of Oncology, Azerbaijan Medical University, Baku, Azerbaijan, over a four-year period from January 2017 to December 2021.

The secondary component involved systematic identification and analysis of comparable cases reported in the peer-reviewed literature from 2020 to 2025, focusing on recent publications that provided detailed clinical and imaging data suitable for comprehensive analysis. All cases of histologically confirmed gossypiboma diagnosed at our institution during the study period were eligible for inclusion.

Inclusion criteria: (1) surgical confirmation of retained surgical sponge or textile material; (2) histopathological verification of foreign body giant cell reaction; (3) documented history of previous abdominal or pelvic surgery; (4) availability of

complete medical records, including operative reports, imaging studies, and follow-up data.

Exclusion criteria: (1) cases in which the diagnosis of gossypiboma was not confirmed surgically and/or histopathologically; (2) retained foreign bodies other than surgical sponges, gauze, or textile materials; (3) cases without a documented history of previous abdominal or pelvic surgery; (4) insufficient clinical data regarding presentation, diagnostic evaluation, treatment, or outcomes; (5) absence of relevant imaging data required for radiological assessment; and (6) duplicate reports describing the same patient. For literature-derived cases, publications that did not provide individual patient-level clinical and imaging data sufficient for inclusion in the comparative analysis were also excluded.

A comprehensive systematic search was conducted across multiple electronic databases, including PubMed/MEDLINE, Embase, and Web of Science. The search strategy employed Medical Subject Headings (MeSH) terms and free-text keywords including “gossypiboma”, “textiloma”, “retained surgical sponge”, and “gynecologic surgery”. Comprehensive data collection was performed using a standardized electronic case report form. Variables included demographic data, surgical history, clinical presentation, imaging findings, diagnostic accuracy, and outcomes. Continuous variables were summarized using means and standard deviations, while categorical variables were presented as frequencies and percentages. Risk factor analysis was performed using Fisher's exact tests and odds ratios with 95 % confidence intervals.

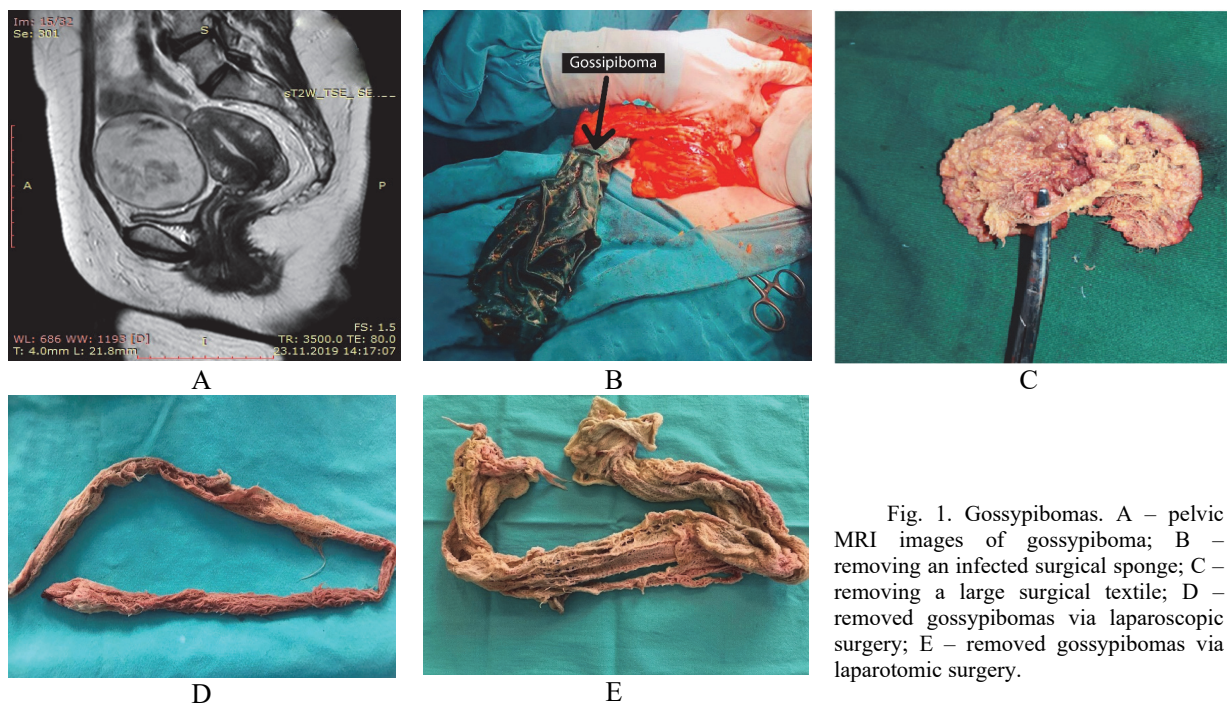


Fig. 1. Gossypibomas. A – pelvic MRI images of gossypiboma; B – removing an infected surgical sponge; C – removing a large surgical textile; D – removed gossypibomas via laparoscopic surgery; E – removed gossypibomas via laparotomic surgery.

Ethical approval. The study protocol was approved by the Local Ethics Committee of the Oncological Department at Azerbaijan Medical University (Approval No. 2024/03/25–64/24), and all procedures were performed in accordance with the

Declaration of Helsinki and institutional guidelines for clinical research. Given the retrospective nature of the study and the use of de-identified data, individual patient consent was waived in accordance with local institutional policies.

Results of the study. A total of 20 cases of gossypiboma were identified and included in this single-center case series. The mean age at diagnosis was 40.9 ± 10.4 years (median 39.5 years, range 24–61 years). Geographic distribution included 50 % from Azerbaijan and 50 % from various international locations.

Analysis of previous surgical procedures revealed cesarean section as the most common antecedent surgery, accounting for 5 cases (25.0 %), followed by ovarian surgery (3 cases, 15.0 %), myomectomy (3 cases, 15.0 %), and appendectomy (3 cases, 15.0 %). (Fig.1)

Emergency surgery was documented in 8 cases (40.0 %), and prolonged surgery duration (>3 hours) was identified in 9 cases (45.0 %). The time interval from previous surgery to gossypiboma diagnosis demonstrated considerable variability, with a mean of 30.9 ± 24.8 months and a median of 24.0 months

(range 3–90 months). The most common presenting symptoms included pelvic pain or pressure (60 % of cases), abdominal mass or distension (45 % of cases), and gastrointestinal symptoms (30 % of cases).

Anatomical location analysis revealed a strong predilection for adnexal involvement, with 11 cases (55.0 %) located in the adnexal region. Pelvic location accounted for 5 cases (25.0 %), while abdominal location represented 2 cases (10.0 %). Less common locations included subphrenic and subdiaphragmatic regions.

CT imaging was performed in all 20 cases. The characteristic spongiform appearance with gas bubbles was identified in 17 cases (85.0 %), representing the most reliable CT finding for gossypiboma diagnosis. MRI was performed in 12 cases (60.0 %), with the pathognomonic “whorled stripes” pattern on T2-weighted images identified in all MRI cases. (Fig. 2)

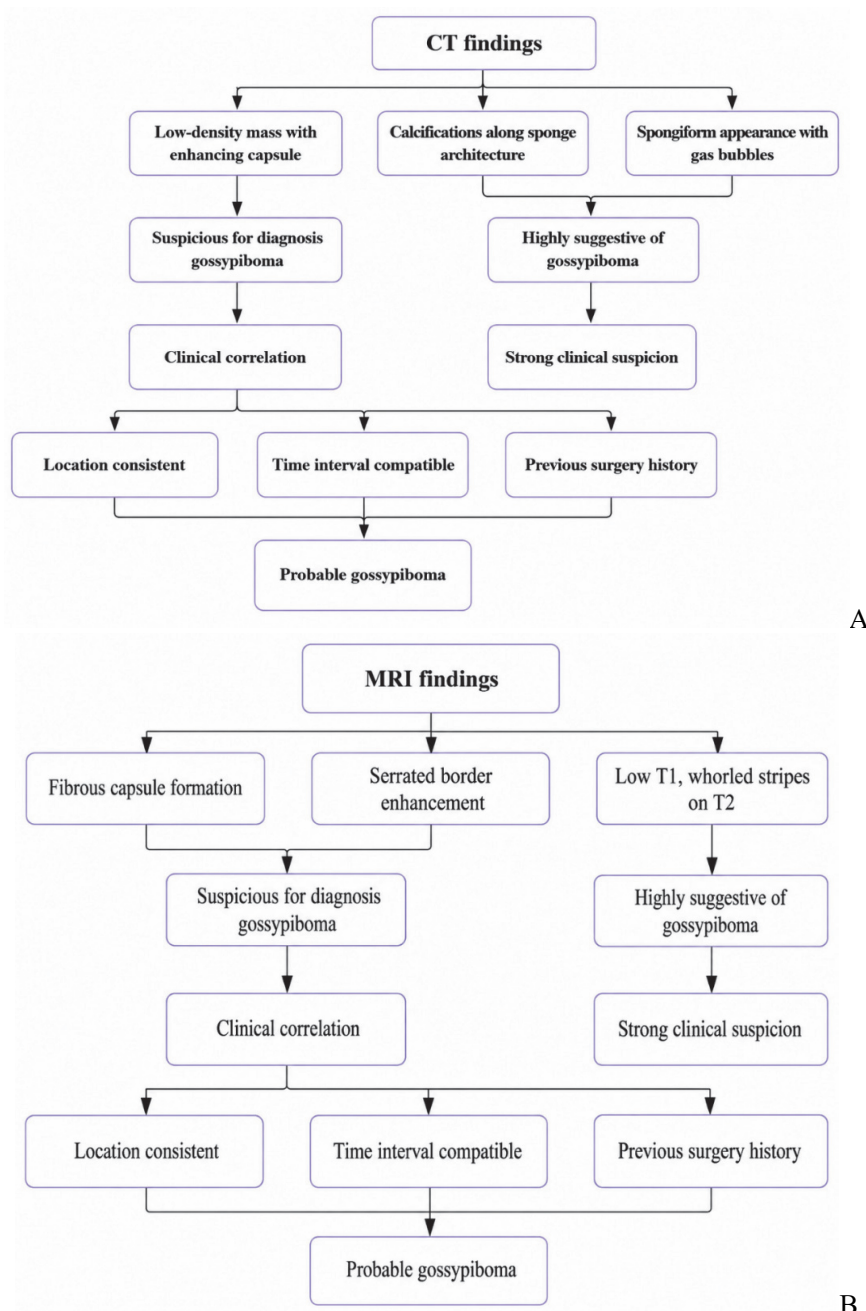


Fig. 2 Diagnostic algorithm of gossypiboma: A – Computed tomography; B – Magnetic resonance imaging.

The proposed diagnostic imaging algorithm emphasizes CT and MRI as complementary modalities in patients with a suspected gossypiboma, particularly in the presence of a previous history of abdominal or pelvic surgery. CT should be considered the principal cross-sectional imaging modality, with careful assessment for a well-defined heterogeneous mass, a thick or enhancing capsule, a characteristic spongiform internal pattern with entrapped gas bubbles, internal wavy or linear hyperdense structures corresponding to retained textile material, and, in chronic cases, peripheral calcification. When CT findings are inconclusive or differentiation from a gynecologic neoplasm remains difficult, MRI provides additional soft-tissue characterization. The most suggestive MRI findings include a well-defined encapsulated mass, low-signal-intensity peripheral wall, heterogeneous internal signal, and characteristic whorled or wavy low-signal-intensity stripes on T2-weighted images representing gauze fibers, with peripheral enhancement after contrast administration. The combination of these characteristic CT or MRI features with a history of previous surgery should raise strong suspicion of gossypiboma and facilitate its differentiation from malignant pelvic tumors, abscesses, hematomas, and other postoperative masses.

Correct preoperative diagnosis was achieved in only 1 case (5.0 %), representing a 95 % misdiagnosis rate. The most common misdiagnoses included adnexal mass of uncertain etiology (40.0 %), ovarian mass or cyst (20.0 %), and pelvic mass (15.0 %). Complications related to gossypiboma or its surgical management occurred in 7 cases (35.0 %), with no mortality observed. Emergency surgery demonstrated an odds ratio of 3.00 (95 % CI: 0.60–15.00, $p=0.356$) for complications, while prolonged surgery duration showed an odds ratio of 5.62 (95 % CI: 0.89–35.4, $p=0.160$).

All cases underwent surgical removal of the gossypiboma. An open surgical approach was employed in 15 cases (75.0 %), while a minimally invasive approach was utilized in 5 cases (25.0 %). Complete removal was achieved in all cases, with histopathological confirmation demonstrating a characteristic foreign body giant cell reaction.

Discussion. This single-center retrospective study demonstrates that gossypiboma continues to pose significant diagnostic challenges in contemporary gynecologic practice, with a misdiagnosis rate exceeding 95 %.

The predominance of adnexal location (55 % of cases) has profound clinical implications, as masses in this anatomical region routinely undergo evaluation for malignancy. Similar diagnostic difficulties have been described in previous reports, including gossypiboma mimicking an ovarian cyst following cesarean section and other tumor-like abdominal and pelvic lesions [4, 10, 12].

Our analysis confirms that modern imaging modalities have significantly improved diagnostic capability for gossypiboma, yet challenges persist in clinical practice. The characteristic spongiform appearance with gas bubbles on CT imaging, identified in 85 % of our cases, represents an important diagnostic feature. MRI may provide additional soft-tissue characterization and contribute to differentiation from neoplastic lesions. Nevertheless, the broad spectrum of clinical and radiological manifestations reported in the literature explains why preoperative recognition remains difficult [1, 11, 12].

Our exploratory analysis identified emergency surgery and prolonged operative duration as potential contributors to complications, although these associations did not reach statistical significance in this small series. The clinical consequences of retained surgical materials can vary substantially. Reported complications include intestinal obstruction and transmural migration, while spontaneous migration through the urinary tract has also been documented following hysterectomy [5, 9, 14]. These observations emphasize that gossypiboma should be considered not only as a diagnostic challenge but also as a potentially serious source of delayed postoperative morbidity.

The medico-legal implications of retained surgical foreign bodies are equally important. Grassi et al. (2025) demonstrated the substantial litigation implications associated with retained surgical foreign bodies, while De Paola et al. (2025) specifically addressed the surgical and forensic consequences of textiloma in the context of medical negligence [2, 7]. Gualniera et al. (2020) further highlighted the role of structured claims management in the extrajudicial resolution of healthcare-related disputes [8]. These findings reinforce the importance of prevention, transparent institutional protocols, and early recognition.

Prevention of retained surgical items should remain a priority of surgical safety programs. Standardized counting procedures, effective communication within the surgical team, appropriate training, early recognition, and prompt retrieval are fundamental components of prevention strategies [15].

The diversity of cases reported across different healthcare settings [4, 10, 11] also highlights the need for prevention strategies that can be implemented in both highly resourced and resource-limited institutions.

Several limitations must be acknowledged, including the retrospective design and the combination of primary cases with literature-derived cases. The rarity and probable underreporting of gossypiboma limit the feasibility of large prospective studies, making case series and literature reviews important sources of clinical evidence [1, 10, 11].

Nevertheless, combining institutional experience with contemporary published cases provides an opportunity to better characterize the

clinical presentation, diagnostic difficulties, imaging features, and outcomes associated with this uncommon but preventable complication.

Conclusion

Gossypiboma continues to represent a significant challenge in contemporary gynecologic practice, with our single-center case series demonstrating persistent diagnostic difficulties and substantial associated morbidity. The 95 % misdiagnosis rate observed in our study underscores the urgent need for enhanced clinical awareness, improved diagnostic protocols, and systematic implementation of evidence-based prevention strategies. The predominance of adnexal location in gynecologic gossypiboma cases has profound clinical implications, leading to unnecessary patient anxiety and extensive oncologic workup. The characteristic imaging features identified in our analysis provide reliable diagnostic clues that should prompt immediate consideration of gossypiboma in patients with appropriate surgical history. Contemporary prevention strategies, including RFID tracking systems, enhanced counting protocols, and comprehensive team training programs, offer promising approaches to reducing gossypiboma incidence. Healthcare institutions must prioritize the implementation of comprehensive prevention programs based on current evidence and best practices.

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Conflict of interest. The authors have no conflicts of interest to declare.

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