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CT MARKERS OF LATENT ABDOMINAL CAVITY INFECTION AFTER SURGICAL TREATMENT

Abstract

Latent abdominal cavity infection after surgical treatment represents a diagnostically challenging condition, as clinical symptoms and laboratory inflammatory markers may be minimal or absent in the early postoperative period. Computed tomography (CT) is the imaging modality of choice for detecting subtle postoperative infectious changes due to its high spatial resolution and ability to assess both anatomical and indirect inflammatory signs. This article reviews key CT markers indicative of latent abdominal infection before overt clinical manifestation and highlights their prognostic significance for early intervention.

Keywords: computed tomography; postoperative complications; latent abdominal infection; intra-abdominal abscess; postoperative fluid collections; fat stranding; peritoneal inflammation; early diagnosis; surgical site infection; abdominal sepsis.

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КТ-МАРКЕРЫ ЛАТЕНТНОЙ ИНФЕКЦИИ БРЮШНОЙ ПОЛОСТИ ПОСЛЕ ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ

Абстракт

Латентная инфекция брюшной полости после хирургического лечения представляет собой сложное диагностическое состояние, так как клинические симптомы и лабораторные воспалительные маркеры могут быть минимальными или отсутствовать в раннем послеоперационном периоде. Компьютерная томография (КТ) - это метод визуализации выбора для выявления тонких послеоперационных инфекционных изменений из-за ее высокой пространственной разрешимости и способности оценивать как анатомические, так и косвенные воспалительные признаки. В данной статье рассматриваются ключевые КТ-маркеры, указывающие на латентную абдоминальную инфекцию до ее явной клинической манифестации, и подчеркивается их прогностическое значение для раннего вмешательства.

Ключевые слова: компьютерная томография; послеоперационные осложнения; латентная абдоминальная инфекция; внутрибрюшной абсцесс; послеоперационные сборы жидкости; жировая затяжка; воспаление брюшины; ранняя диагностика; инфекция операционного участка; абдоминальный сепсис.

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JARROHLIK DAVOLASHDAN KEYIN QORIN BO'SHLIG'I LATENT INFEKSIYASINING KT MARKERLARI

Abstrakt

Xirurgik davolashdan keyin qorin bo'shlig'ining yashirin infeksiyasi diagnostik jihatdan qiyin holat hisoblanadi, chunki klinik simptomlar va laboratoriya yallig'lanish belgilari operatsiyadan keyingi erta davrda minimal bo'lishi yoki umuman bo'lmasligi mumkin. Kompyuter tomografiyasi (KT) yuqori fazoviy aniqlik va anatomik hamda bilvosita yallig'lanish belgilarini baholash qobiliyati tufayli operatsiyadan keyingi nozik infeksiyon o'zgarishlarni aniqlash uchun tanlangan tasvirlash usulidir. Ushbu maqolada ochiq klinik ko'rinishdan oldin yashirin qorin bo'shlig'i infeksiyasini ko'rsatadigan asosiy KT belgilari ko'rib chiqiladi va ularning erta aralashuv uchun prognostik ahamiyati ta'kidlanadi.

Tayanch iboralar: kompyuter tomografiya; operatsiyadan keyingi asoratlar; qorin bo'shlig'ining latent infeksiyasi; qorin bo'shlig'i ichi absessi; operatsiyadan keyingi suyuqlik yig'malari; yog' to'planishi; qorin pardaning yallig'lanishi; erta tashxis qo'yish; operatsiya maydonining infeksiyasi; abdominal sepsis.

Introduction

Postoperative infectious complications remain a major cause of morbidity after abdominal surgery. While overt intra-abdominal abscesses are usually clinically evident, early or latent infections may progress silently, delaying diagnosis and treatment. Reliance solely on clinical examination and laboratory tests can be misleading, particularly in immunocompromised or elderly patients.

CT plays a pivotal role in early detection by revealing indirect signs of infection, including subtle inflammatory changes in fat planes, fluid collections of uncertain significance, and microgas formation. Recognition of these CT markers allows timely therapeutic decisions and may prevent progression to severe sepsis or anastomotic failure.

Materials and Methods

Contrast-enhanced abdominal CT is performed in portal venous phase, with additional arterial or delayed phases when indicated. The assessment focuses on:

- postoperative fluid collections and their morphology;
- density characteristics (HU) of collections;
- presence of gas not explained by recent surgery;
- inflammatory changes in surrounding fat and mesentery;
- enhancement patterns of peritoneum and bowel walls.

Findings are interpreted in correlation with surgical history and postoperative timing.

Results

CT reveals several reproducible markers associated with latent abdominal infection. Fluid collections with mildly increased attenuation (20–40 HU), thick or irregular walls, and subtle peripheral enhancement are frequently observed. Small gas bubbles persisting beyond the expected postoperative period raise suspicion of occult infection.

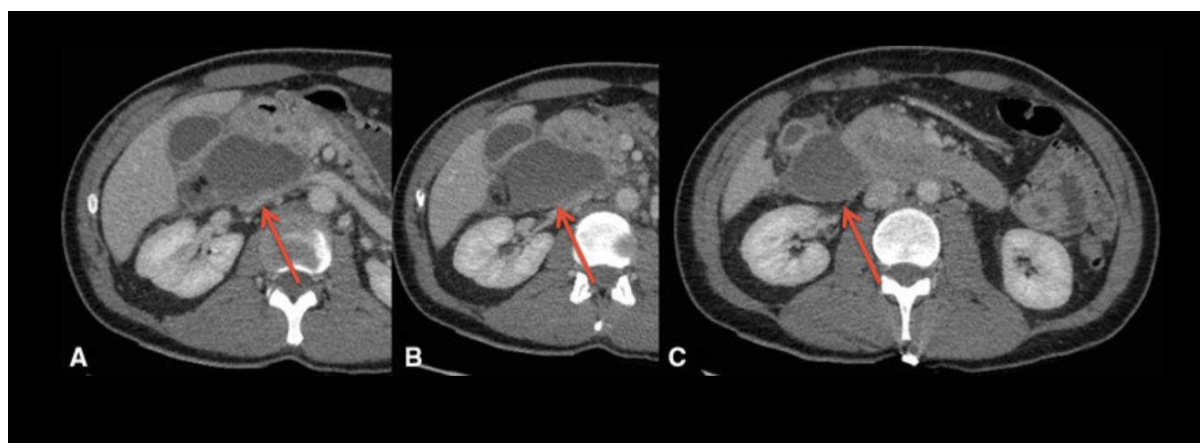
Table 1. CT markers of latent abdominal cavity infection

CT marker	Imaging characteristic	Diagnostic significance
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Fluid collection	20–40 HU, irregular margins	Early infection
Gas bubbles	Persistent or increasing	Bacterial activity
Fat stranding	Localized, progressive	Inflammatory response
Peritoneal thickening	Contrast enhancement	Peritoneal irritation
Bowel wall changes	Hyperenhancement, edema	Adjacent infection

Inflammatory fat stranding, focal peritoneal thickening, and localized bowel wall hyperenhancement are indirect but highly sensitive indicators. These changes often precede clinical deterioration and laboratory evidence of infection.

Figure 1. Subtle postoperative fluid collection with inflammatory features



Discussion

Latent abdominal infection reflects an early inflammatory stage before abscess encapsulation or systemic response. CT markers primarily represent microcirculatory disturbance, exudation, and early bacterial activity. Differentiation between normal postoperative changes and infection requires attention to distribution, progression on follow-up imaging, and correlation with operative details.

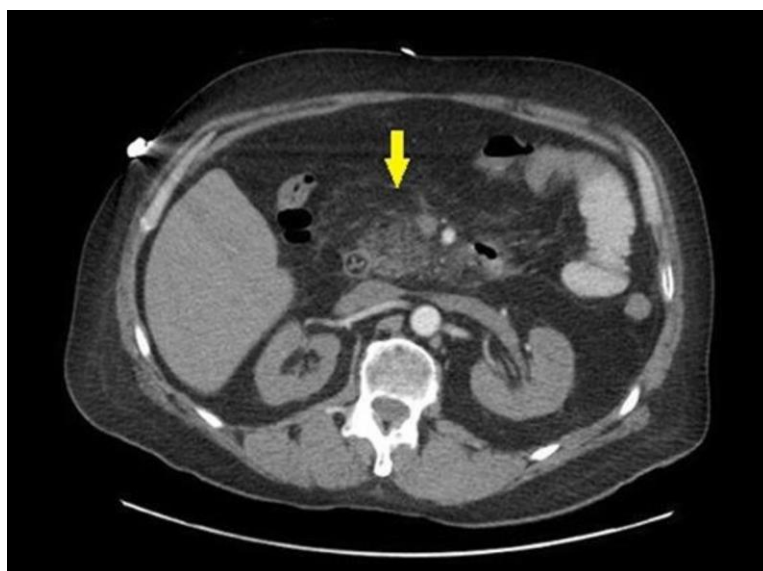


Figure 2. Persistent gas and inflammatory fat stranding

Early CT detection allows prompt initiation of antibiotics or minimally invasive drainage, reducing the risk of anastomotic leakage, generalized peritonitis, and prolonged hospitalization.

Conclusion

CT is a highly sensitive modality for detecting latent abdominal cavity infection after surgical treatment. Recognition of subtle CT markers—such as atypical fluid collections, persistent gas, fat stranding, and peritoneal enhancement—enables early diagnosis before clinical and laboratory deterioration. Incorporation of CT-based criteria into postoperative monitoring protocols can significantly improve surgical outcomes.

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