Non-surgical pneumoperitoneum after oro-genital intercourse

Shamir O. Cawich, Peter B. Johnson, Eric Williams, Vijay Naraynsingh

1 Department of Clinical Surgical Sciences, University of the West Indies, St Augustine Campus, Trinidad and Tobago
2 Department of Surgery, University of the West Indies, Mona Campus, Jamaica

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ABSTRACT

INTRODUCTION: In many cases, a pneumoperitoneum is due to air escaping from a perforated hollow viscus or surgical intervention but there are increasing reports of non-surgical causes.

PRESENTATION OF CASE: We report a case where a pneumoperitoneum was identified after oro-genital sexual intercourse.

DISCUSSION: There were nineteen reported cases of non-surgical pneumoperitoneum from gynaecologic causes up to May 2013. We report an additional case four hours after oro-genital intercourse. Close clinical observation and symptomatic treatment are usually all that is required if operative interventions should be considered if the patient develops abdominal pain, peritoneal signs, fever or leukocytosis during observation.

CONCLUSION: This adds to the world literature on non-surgical pneumoperitoneum from oro-genital intercourse. Clinicians should be aware of this condition and focus on medical-sexual history as this information could prevent a patient from being exposed to expensive diagnostics and invasive operative treatments. Patients should also be educated about the mechanisms to avoid future possible diagnostic dilemmas.

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1. Introduction

In many cases a pneumoperitoneum is due to air escaping from a perforated hollow viscus or surgical intervention. This is considered a surgical emergency, demanding prompt control of the perforation and peritoneal toilet. However, there are increasing reports of non-surgical pneumoperitoneum, a condition in which radiographs demonstrate free peritoneal air. These may lead to unnecessary laparotomy but, if correctly diagnosed, can be managed successfully by observation alone.1 We report one such case where a pneumoperitoneum was identified after oro-genital sexual intercourse.

2. Presentation of case

A 21-year-old woman with a body mass index of 22.3 presented to hospital complaining of sudden onset right-sided abdominal pain. She was dehydrated and pyrexic at 100°F. The abdomen was asymmetrical distended and tender with peritonitis on the right side. Leukocytosis was present with a white cell count at 16.1 × 10³ units. Serum electrolytes, urea, creatinine and amylase levels were normal.

She was taken to the operating room for abdominal exploration through a midline laparotomy incision. An enlarged right polysystic kidney was encountered with bosselated surface (Fig. 1). There was pyonephrosis with a thin, translucent renal cortex and a grossly dilated ureter present down to the bladder. The left kidney was mildly enlarged with a normal ureter. No further abnormalities were detected at any other intra-abdominal viscera.

Since there was no discernible renal parenchyma and an obvious pyonephrosis, a right nephroureterectomy was performed (Fig. 2). She was discharged home 5 days post-operatively after an uneventful recovery period.

Pathologic examination revealed a 12 cm × 20 cm × 32 cm right kidney that weighed 4870 g. Histology confirmed pyonephrosis of the kidney with no normal renal cortex. A thin translucent membrane <1 mm mural thickness represented the renal capsule (Fig. 3). There were multiple cysts lined by flattened cuboidal cells and marked inflammatory cell infiltrates. Circumferential scarring at the distal ureter near the vesico-ureteric junction was responsible for the hydro-ureter. Urinary cultures revealed significant growth of Escherichia coli Spp but no gas forming organisms were present.

Eight weeks post-operatively, she was sent for elective CT urogram to evaluate the left kidney function. To our surprise, a large pneumoperitoneum was present, predominantly on the right side (Figs. 4 and 5).

Clinically she was well. There was no history of colonoscopy, cystoscopy or any other invasive interventions since the time of...
Fig. 1. Right hydronephrosis and hydroureter encountered at laparotomy.

Fig. 2. Nephrectomy specimen.

Fig. 3. Gross examination of right kidney reveals cystic transformation and cortical replacement.

Fig. 4. Axial CT slice of upper abdomen demonstrating a pneumoperitoneum (P) that is contained by the diaphragm (D) and liver (L).

Fig. 5. CT scout films of the abdomen demonstrating a pneumoperitoneum (P) that is contained by the diaphragm (D) and the liver (L). A dilated stomach (S) is also seen.

Fig. 6. Index patient immediately post CT scanning demonstrating a flat abdomen.

operation. The abdomen was soft, flat and non-tender (Fig. 6). She had a white cell count of $4.3 \times 10^6$ dl$^{-1}$ and no evidence of metabolic acidosis. Upon further detailed questioning she admitted to engaging in sexual activity approximately four hours prior to CT scanning. Specifically, there was cunnilingus lasting approximately 15 min and that was followed by regular vaginal intercourse. She denied deliberate vaginal insufflation, anal intercourse or any other sexual acts.

She was admitted for clinical observation. No antibiotics were prescribed. Over the subsequent 48 h, she remained clinically well with no fever, abdominal signs or leukocytosis. She was discharged and remained well up to six months later. As she remained clinically well, a conscious decision was made not to subject this patient to any form of repeat imaging to reassess the pneumoperitoneum.

3. Discussion

A pneumoperitoneum can be detected on plain radiographs in 60% of patients after open surgery and 25% after laparoscopy but we expect a progressive reduction in volume as gas is resorbed across the peritoneum. On follow-up radiographs, there is usually complete reabsorption of room air within 5 days of open surgery. Carbon dioxide is much more rapidly absorbed at average rates of 37 ml/min, with complete resolution of pneumoperitoneum within 2–4 h of laparoscopy. Computed tomography scans are far more sensitive for a pneumoperitoneum than plain radiographs. A pneumoperitoneum can be detected on CT in >85% of post-operative patients at day 3 and >50% at day 6. Additionally, lean adults tend to have prolonged
duration of pneumoperitoneum after abdominal procedures than over-weight adults. Although our patient had two recognized pre-dispositions (BMI of 22.3 and recent open surgery), we considered it unlikely that this was secondary to her laparotomy because there has never been a post-operative pneumoperitoneum reported 8 weeks after laparotomy.

Excluding post-operative cases, the presence of a pneumoperitoneum signals the presence of a perforated hollow viscus in 90% to 95% of cases. These patients require emergent surgical treatment that is directed at controlling the perforation and achieving peritoneal toilet. In a minority of cases, a pneumoperitoneum is detected in the absence of clinical signs that suggest an intra-abdominal emergency. The terms benign, spontaneous and non-surgical pneumoperitoneum have been applied to these cases.

Daly classified non-surgical pneumoperitoneum into abdominal, thoracic and pelvic causes. Compared to the other causes of non-surgical pneumoperitoneum, a pelvic (gynaecologic) cause is uncommon. Mularski et al. performed a systematic review of world literature on non-surgical pneumoperitoneum and identified only 15 reported cases that were due to gynecologic causes up to the year 2000. We performed a Pubmed search using the keywords “spontaneous”, “non-surgical”, “benign”, “pelvic” and “gynaecologic” in May 2013 and encountered 4 additional cases of non-surgical pneumoperitoneum from gynaecologic causes.

The common gynaecologic causes include pelvic examinations, post-partum knee–chest exercises, vaginal douching, pelvic inflammatory disease, hysterosalpingography and water skiing. The essential mechanism is the passage of air through the vagina, cervix, uterus and fallopian tubes into the peritoneum or through a vaginal stump opening in patients who have had hysterectomies.

The only identifiable cause in our patient was the recent history of oro-genital intercourse 4 h prior to CT. This reinforces the need to take a thorough history because most patients will not volunteer sexual histories since they cannot readily make a link between sexual practices and their symptoms or radiographic findings. This may prevent the exposure of these patients to expensive investigations and non-therapeutic laparotomies.

This should still be considered a diagnosis of exclusion since peritonitis may be masked in immunocompromised patients. Once the diagnosis is established, however, close clinical observation and symptomatic treatment are usually all that is required. Antibiotics are not indicated as there is no infective pathophysiological mechanism. Operative intervention should be considered if the patient develops abdominal pain, peritoneal signs, fever or leukocytosis during observation.

4. Conclusion

This case adds to the world literature on non-surgical pneumoperitoneum from oro-genital intercourse. Clinicians should be aware of this condition and focus on medical-sexual history as this information could prevent a patient from being exposed to expensive diagnostics and invasive operative treatments. Patients should also be educated about the mechanisms to avoid future possible diagnostic dilemmas.

Conflict of interest statement

There are no potential sources of conflict declared by any of the authors.

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and case series and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

SOC conceptualized this manuscript, collected data and wrote the manuscript.
PBJ assisted in writing this manuscript and checked it for intellectual content.
EWW assisted with data collection and analysis of the manuscript.
VN assisted with data collection, writing and analysis of the intellectual content in this paper.

References

1. Mularski RA, Ciccolo M, Rappaport WD. Nonsurgical causes of pneumoperitoneum. West J Med 1999; 170: 41–6.
2. Mularski RA, Sipple JM, Osborne ML. Nonsurgical pneumoperitoneum: a review of nonsurgical causes. Crit Care Med 2000; 28(7): 2638–44.
3. Daly BD, Guthrie JA, Couse NF. Nonsurgical pneumoperitoneum without peritonitis. Postgrad Med J 1991; 67: 999–1003.
4. Jacobs VR, Mundhenke C, Maas N, Hilpert F, Jonat W. Sexual activity as a cause for non-surgical pneumoperitoneum. JLS 2000; 4: 297–300.
5. Nielen RT, Lund L, Larsen LP, et al. Duration of postoperative pneumoperitoneum. Eur J Surg 1997; 163: 501–3.
6. Stapak JC, Thickman D. Diagnosis of pneumoperitoneum: abdominal CT vs. upright chest film. J Comput Assist Tomogr 1992; 16: 713–6.
7. Earls JP, Dachman AH, Colon E, et al. Prevalence and duration of postoperative pneumoperitoneum: sensitivity of CT vs left lateral decubitus radiography. AJR Am J Roentgenol 1993; 161: 781–5.
8. Bryant LR, Wolf JF, Kloekker RJ. A study of the factors affecting the incidence and duration of post-operative pneumoperitoneum. Surg Gynecol Obstet 1963; 117: 145–50.
9. Ecker AH, Meldrum DJ, Hoexter JM, et al. Non-surgical pneumoperitoneum with fiberoptic colonoscopy: a prospective study of 100 patients. Gastrointest Endosc 1977; 73: 226–30.
10. Madura MJ, Craig RM, Shields TW. Unusual causes of spontaneous pneumoperitoneum. Surg Gynecol Obstet 1982; 154: 417–20.
11. Matsuura M, Nishikawa N, Okano T, Hoshi K, Suzuki A, Ikeda S. Spontaneous pneumoperitoneum: an unusual complication of systemic reactive AA amyloidosis secondary to rheumatoid arthritis. Amyloid 2003; 10: 42–6.
12. Derveaux K, Penndieck F. Recurrent spontaneous pneumoperitoneum: a diagnostic and therapeutic dilemma. Acta Clin Belg 2003; 103: 490–2.
13. Marwah S, Gupta R, Dhall JC. Non-surgical spontaneous pneumoperitoneum: a case report. Indian Practitioner 2002; 55: 122–4.
14. Rowe NM, Kahn FB, Acinapura AJ, Cunningham JN. Nonsurgical pneumoperitoneum: a case report and a review. Am Surg 1998; 64: 513–22, 19.
15. Cooper EL, Cole GD, Mitchell LS, Adams CZ, Hassett J. Avoiding laparotomy in nonsurgical pneumoperitoneum. Am J Surg 1992; 164: 99–103.
16. Im DD, Pak PS, Cua B, Feinberg E. Pneumoperitoneum after sexual assault in a patient who had hysterectomy 30 years ago: case report. J Emerg Med 2012; 42(5): 540–2, doi: 10.1016/j.emermed.2011.05.049.
17. Eskandar O, El Badawy S, Bennett S. Spontaneous non-surgical pneumoperitoneum in a 34-week-pregnant patient. Aust N Z J Obstet Gynaecol 2007 Apr; 47(2): 150–1.
18. Vlachou PA, Aslam N, Natsios A, Anagnostopoulos FK, Murphy P. Non-surgical pneumoperitoneum following cervical smear test. Eur J Obstet Gynecol Reprod Biol 2007; 131(2): 240–1.
19. Jacobs VR, Mundhenke C, Maas N, Hilpert F, Jonat W. Sexual activity as cause for non-surgical pneumoperitoneum. JLS 2000; 4: 297–300.
20. Cass LJ, Dow EC, Brooks JR. Pneumoperitoneum following pelvic examination. Am J Gastroenterol 1966; 45: 209–11.
21. Dodek SM, Friedman JM. Spontaneous pneumoperitoneum. Obstet Gynecol 1953; 1: 689–98.
22. Lozman H, Newman AJ. Spontaneous pneumoperitoneum occurring during postpartum exercises in the knee–chest position. Am J Obstet Gynecol 1956; 72: 903–5.
23. Christiansen WC, Danzl DF, McGee HJ. Pneumoperitoneum following vaginal insufflation and coitus. Ann Emerg Med 1980; 9: 480–2.
24. Spaulding LB, Gallop DA. Pneumoperitoneum after hysterectomy. JAMA 1979;241:825.
25. Tabrinsky J, Mallin LP, Smith JA. Pneumoperitoneum after coitus: a complication due to uterine prolapse after vaginal hysterectomy. Obstet Gynecol 1972;40:218–20.
26. Collins KA, Davis GJ, Lantz PE. An unusual case of maternal-fetal death due to vaginal insufflation of cocaine. Am J Forens Med Path 1994;15(4):335–9.
27. Fyke III FE, Kazmier FJ, Harms RW. Venous air embolism: life threatening complication of orogenital sex during pregnancy. Am J Med 1985;78:333–6.
28. (a) Freeman RK. Pneumoperitoneum from oral-genital insufflation. Obstet Gynecol 1970;36:162–4; (b) AJR Am J Roentgenol 1940;43:377–82.
29. Varon J, Laufer MD, Sternbach GL. Recurrent pneumoperitoneum following vaginal insufflation. Am J Emerg Med 1991;9:447–8.
30. Walker MA. Pneumoperitoneum following a douche. J Kansas Med Soc 1942;4:3–5.
31. Miller RE. The radiological evaluation of intraperitoneal gas (pneumoperitoneum). Crit Rev Clin Radial Nucl Med 1973;4:61–85.
32. Johnson LB. A case report: peritonitis after water skiing. Lakartidningen 1993;90(25):2383.
33. Boroweski GD, Veloso A, Nothmann BJ. Recurrent pneumoperitoneum after hysterectomy. J Clin Gastroenterol 1983;5:81–2.
34. Nicolsen SC, Gillmer MDG. Management of postcoital pneumoperitoneum following hysterectomy. J Obstet Gynecol 1993;13(4):289–90.