The American Journal of Surgery (2014) 207, 915-921

The American Journal of Surgery®

Clinical Science

Predictive factors for failure of percutaneous drainage of postoperative abscess after abdominal surgery

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KEYWORDS:
Percutaneous drainage;
Imaging guidance;
Postoperative abscess

Abstract

BACKGROUND: The aims of this study were to assess the efficacy of percutaneous drainage of postoperative abscess after abdominal surgery and to identify factors predictive of failed drainage.

METHODS: Data from 81 patients with postoperative abdominopelvic abscesses treated with percutaneous drainage were reviewed. Percutaneous drainage failure was considered when surgery was needed to control the sepsis. Predictive variables were sought using univariate and multivariate analyses with logistic regression models.

RESULTS: Successful drainage requiring 1 (n = 46) or 2 (n = 17) procedures was observed in 63 patients (78%; 95% confidence interval, 67%–86%). Surgery was needed in 18 patients (22%; 95% confidence interval, 14%–38%). Residual collection after a first percutaneous drainage was the single predictive factor for failed drainage on univariate and multivariate analyses ($P = .0275$).

CONCLUSIONS: Percutaneous imaging-guided drainage is a feasible and effective method for the treatment of abdominopelvic abscess, with a success rate of 78%. Residual collection is an independent predictor of unfavorable outcome after percutaneous drainage.

Percutaneous drainage under imaging guidance is a well-accepted procedure for the treatment of intra-abdominal and intrapelvic abscesses.[1–4] The use of this technique may help obviate more costly and time-consuming surgical procedures. In addition, percutaneous drainage results in lower mortality rates in comparison with those obtained with surgical drainage.[4,5]

Several studies have reported the results of percutaneous drainage of abdominopelvic abscesses, with success rates ranging between 65% and 92%.[2,6,7] However, the majority of studies have reported results in the aggregate, including abscesses or collections due to various causes,[6,8,9] whereas others have specifically focused on collections due to Crohn's disease or appendicitis.[8,10] Conversely, few studies have specifically focused on postoperative abscesses.[11–13] In addition, dramatic changes in surgical techniques have been made since prior reports were published.[14] In this regard, celioscopy is now often used for abdominal surgery.[15,16]

The authors declare no conflicts of interest.

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Manuscript received April 24, 2013; revised manuscript July 11, 2013

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http://dx.doi.org/10.1016/j.amjsurg.2013.07.041

Table 1 Demographic characteristics, preprocedural computed tomographic findings, and procedure-related variables in 81 patients who underwent image-guided percutaneous drainage for postoperative abscess

Variable	Value
Age (y)	53.4 ± 18.7 (20–96)
Men/women	52/29
ASA score	2.1 ± .791 (1–4)
Associated chronic vascular disease	37% (30)
Diabetes	9% (7)
Hepatic cirrhosis	1% (1)
Underlying cancer	47% (38)
Surgical approach	
Celioscopy	17% (14)
Laparotomy	83% (67)
Reason for surgery	
Appendicitis	17% (14)
Gastrointestinal cancer	47% (38)
Cholecystectomy	9% (7)
Miscellaneous	27% (22)
White blood cell count	13,820 ± 4,025 (1,650–27,000)
Delay between surgery and abscess (d)	11.1 ± 6.8 (3–36)
Abscess size (mm)	72.5 ± 27.1 (40–180)
Number of abscesses per patient	
1	75% (61)
2	17% (14)
3	5% (4)
4	2% (2)
Abscess with internal walls	77% (62)
Associated fistula	5% (4)
Imaging guidance	
Sonography	37% (30)
Computed tomography	63% (51)
Drain diameter (Fr)	11.3 ± 2.1 (7.5–18)
Number of drains per patient	
1	75% (61)
2	17% (14)
3	5% (4)
4	2% (2)
No suction bag	12% (10)
Purulent aspirate	85% (69)
Residual collection	33% (27)
Positive culture of aspirate	63% (51)
Drainage length (d)	13.2 ± 12.1 (2–74)

Data are expressed as mean ± SD (range) or as percentage (number).
ASA = American Society of Anesthesiologists.

Although imaging-guided percutaneous drainage in combination with broad-spectrum intravenous antibiotics is an effective treatment in the majority of patients with postoperative abscesses, for some reasons that should be clarified, a number of patients with this condition, may not respond favorably to percutaneous drainage. The search for effective predictors of percutaneous drainage failure has been the goal of several works.[4,12,17] In 1 of these, a lack of antibiotics in association with percutaneous drainage was correlated with failure to control the sepsis in case of postoperative abdominopelvic abscess.[12] In another, postoperative collections were more likely to respond favorably to percutaneous drainage than those secondary to acute pancreatitis but more frequently required repeated drainage.[17]

These inconsistent results in the literature make it necessary to clearly identify the causes of failed percutaneous drainage of postoperative abscess. The search for predictive factors of outcomes is a critical issue because failed percutaneous drainage results in prolonged hospital stays with accompanying increased hospital costs. Failed percutaneous drainage may require a repeated procedure and ultimately surgery. Predicting the failure of percutaneous drainage would result in a more timely appropriate effective surgical treatment.

This study was performed to retrospectively assess the efficacy and safety of percutaneous drainage of postoperative abscess after abdominopelvic surgery and to identify factors that may be predictive of failed percutaneous drainage.

Methods

Patients

From January 2006 through December 2011, the database of our institution was retrospectively queried to identify all adult patients who had percutaneous imaging-guided drainage of the abdomen or pelvis. This study was conducted according to the recommendations of the local institutional review board, and the need for informed consent was waived.

After this initial search, the electronic archiving system of our institution was used to retrieve the subgroup of patients who underwent abdominopelvic surgery within the 45 days before percutaneous drainage. The full medical records of this subgroup of patients (including clinical, biologic, surgical, and imaging data, as well as discharge summaries), were reviewed by the study coordinator using a standardized data collection form that included quantitative and qualitative variables (Table 1).

The final cohort comprised 81 patients (mean age, 53.4 ± 18.7 years; range, 18–96 years) who underwent imaging-guided percutaneous drainage of the abdomen or pelvis because of a postoperative abscess. There were 52 men (mean age, 49.9 ± 19.6 years) and 29 women (mean age, 59.7 ± 15.4 years). For all patients, imaging data, including computed tomography (CT) performed before and after percutaneous drainage, ultrasonographic reports, and reports for all drainages, were reviewed by an interventional radiologist. No patients were excluded because of missing data.

Diagnostic computed tomography and percutaneous drainage procedure

Diagnostic CT was performed using a 64-slice scanner (Somatom Sensation 64; Siemens Healthcare, Forchheim, Germany) in all patients with the following parameters: tube voltage, 120 kVp; effective tube current–time product,