Povidone-Iodine Soaks for Hand Abscesses: A Prospective Randomized Trial

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Purpose To determine the effect of povidone-iodine soaks on outcomes of hand infections after operative drainage.

Methods We performed a single-center, prospective, randomized trial to evaluate 100 consecutive hand infections. Forty-nine patients received povidone-iodine soaks 3 times daily, and 51 patients received only daily dressing changes. Outcome measures were the number of operations, readmissions, reoperations for wound complications, and days spent in the hospital.

Results Patients treated with povidone soaks averaged 1.6 operations, and patients treated with daily dressing changes averaged 1.4 operations, a statistically insignificant difference. The mean number of operations was also not different between groups for the dorsal hand or dorsal finger abscess subcategories. No significant differences were found in length of stay, number of readmissions, or number of reoperations for wound complications.

Conclusions Povidone-iodine soaks are not helpful in the postoperative management of hand infections *(J Hand Surg Am. 2014;39(5):962–965. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic II.

Key words Betadine, hand infection, hand soaks, iodine, povidone.

Acute hand infections may lead to debilitating sequelae such as stiffness, fibrosis, and even amputation.[1,2] Contemporary management of hand abscesses nearly universally consists of surgical drainage combined with appropriate antibiotic therapy.[3] However, postoperative wound care protocols vary. Strategies such as applying "wet-to-dry" gauze dressings, inserting drains, irrigating wounds, employing negative pressure therapy, and soaking wounds in antiseptic solutions are all methods intended to enhance recovery and prevent recurrence; however, surgeon preference still largely determines the wound care protocol, and few methods have evidence to support routine use.

Povidone-iodine soaks are a popular adjunct to surgery and antibiotic therapy.[4] Several studies have reported the potent bacteriocidal activity of povidone-iodine as a surgical skin preparation.[5–11] However, the clinical merits of soaking infected wounds in povidone-iodine have not been proven. The purpose of this prospective randomized trial was to evaluate the effectiveness of postoperative povidone-iodine soaks, with a null hypothesis that the application of povidone-iodine soaks would not result in a significant reduction in the mean number of operations or length of stay required to treat acute hand abscesses. Our secondary goals were to compare the number of readmissions and reoperations for wound complications.

MATERIALS AND METHODS

We obtained institutional review board approval for a prospective, randomized clinical trial. From April

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2012 to September 2013, all hand abscesses treated surgically by the orthopedic surgery service at our urban academic hospital were identified for possible inclusion in the study. Exclusion criteria included purulence proximal to the wrist, absence of purulent fluid, chronic wound infections, and premature discharge from the hospital against medical advice. When purulent fluid was confirmed at the time of debridement, patients were randomized via a computer-generated schedule to receive povidone-iodine soaks versus daily dry gauze dressings without soaks. Patients were provided with an informed consent form after the first drainage. The diagnosis of the type of hand infection was made by a fellowship-trained hand surgeon.

Management of acute hand infections

The diagnosis of hand abscess was made at the time of incision and drainage. Patients received empiric antibiotic coverage at the time of admission, which was selected to account for a high regional methicillin-resistant *Staphylococcus aureus* prevalence.[12] Patients with a history of bite wounds (including *fight bites*) were empirically treated with intravenous ampicillin-sulbactam, whereas all others were given vancomycin. Patients with a dorsal hand or finger abscess who were febrile (temperature greater than 38°C) upon presentation were treated initially with a bedside incision and drainage by the orthopedic resident and were packed with an iodinated gauze wick. Paronychias and felons were treated initially at the bedside regardless of body temperature. Otherwise, admitted patients were splinted and scheduled for the operating room the following day. All patients received a thorough debridement in the operating room with excision of necrotic tissue. Intraoperative cultures were obtained in all subjects. The wounds were irrigated with 3 L normal saline under a low-velocity irrigation system and then partially closed over a Penrose drain or an iodinated gauze wick. The wounds were then dressed with an iodine-petroleum gauze, sterile gauze, and an orthosis. All patients (treated at the bedside or operating room) were examined by a fellowship-trained hand surgeon on the day after drainage, and the need to return to the operating room was assessed daily on morning rounds. Patients returned to the operating room if persistent or progressive erythema was noted or if purulent fluid was expressed from the wound. On the first postoperative day, the Penrose drain or gauze wicks were removed. For those randomized to the soak group, a 10% povidone-iodine solution was mixed with normal saline in a 1:1 ratio, and the hands were submerged for 20 minutes, 3 times per day. After each soak, the nursing staff would redress the wound with sterile gauze and an orthosis. For those randomized to receive no soaks, the wounds were treated with a daily dressing change with sterile gauze and an orthosis. The open portions of the wounds were allowed to heal by secondary intention, and based on culture results, the antibiotic coverage was narrowed. The attending surgeon determined discharge eligibility, which occurred after culture sensitivities returned. Patients were given 10 days of oral antibiotics at discharge unless they had had positive blood cultures. In that case, they received 6 weeks of intravenous antibiotics and were observed by an infectious disease consultant. We did not recommend soaks after discharge because patient compliance would be suspect. Patients were asked to follow up 1, 3, and 6 weeks later. The number of surgeries and inpatient days were counted as the cumulative total over a 6-week period after the last discharge.

We used Fisher exact test for categorical variables and Student t test for continuous variables. Statistical significance was determined by $P < .05$. A sample size calculation based on 80% power was also estimated to be 9 subjects/group to detect a difference of 1 operation.

RESULTS

Two patients from each group were excluded from the final analysis for leaving the hospital against medical advice. A total of 100 hand infections met inclusion criteria. Most subjects were males in the fifth decade of life. The proportions of comorbidities between groups were not significantly different (Table 1). White blood cell count, erythrocyte sedimentation rate, and c-reaction protein also were not significantly different. Dorsal hand abscess and dorsal finger abscess were the 2 most common diagnoses. Trauma and intravenous drug use were the most common etiologies. The proportions of etiologies and diagnoses were also not significantly different between the study groups (Table 2).

Bedside drainage was performed in 41% of those who received soaks and 31% of those who did not ($P = .25$) (Table 3). The mean number of operations between groups was not significantly different (1.6 in the soaks group and 1.4 in the no-soaks group; $P = .25$). Subgroup analysis was performed for dorsal hand and dorsal finger abscess, which also did not result in a significant reduction in the mean number of operations. Readmissions and lengths of stay were not significantly different between groups. Wound complications requiring reoperation were present in both groups. The soak group had 1 patient who required a