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■ General

To Drain or Not to Drain; Still a Valid Question?

Guest Reviewers: David B. Tashjian, MD, and Nicholas P. W. Coe, MD

DRAINAGE AFTER THYROID SURGERY: A PROSPECTIVE RANDOMIZED STUDY. Debry C, Renou G, Fingerhut A. Journal Laryngol Otolo 1999;113:49-51.

Objective: To determine whether routine drainage after thyroidectomy is justified.

Design: Prospective, randomized data base.

Setting: Otolaryngology Unit of the Centre Hospitalier Intercommunal, Poissy, France.

Participants: Between November 1996 and May 1997, 100 consecutive patients undergoing either partial or total thyroidectomies were randomized to either an undrained or closed suction drain group. All patients, except those with metastatic cervical lymphadenopathy requiring neck dissection, were eligible for the study. These patients were routinely drained and, thus, excluded from consideration. Intraoperative blood loss, postoperative complications including hematoma and infection, and length of hospital stay were examined.

Results: No significant difference was found between the drained and undrained groups with regard to postoperative hematoma, wound infection, or length of hospital stay.

Conclusions: Based on these findings, routine drainage of thyroid surgery is unnecessary.

SURGICAL TREATMENT OF INFECTED NECROSIS. Rau B, Uhl W, Buchler MW, Beger HG. World J Surg 1997;21:155-161.

Objective: To compare drainage modalities for infected pancreatic necrosis.

Design: Retrospective review of cases from May 1982 to December 1995.

Setting: University of Ulm Hospital, Ulm, Germany.

Participants: The data pertinent to the 3 different treatment techniques for infected pancreatic necrosis were reviewed. For closed management, 52 patients records were

REVIEWER COMMENTS

Drainage after thyroid surgery is one controversial area in general surgery. Some surgeons routinely drain every thyroidectomy, others never use drains, and still others selectively drain post-thyroid surgery.

Multiple reports support Debry and associates' conclusion.[1-4] Wihlborg and associates[2] randomized 150 consecutive patients undergoing thyroidectomy to either no drain or closed suction drain. They reported 1 postoperative hematoma in each group. Ruark and Abdel-Misih[4] reviewed 110 thyroidectomies, both partial and total. Drains were not used on any patient. No wound infections, hematomas, or bleeding requiring reoperation were reported. These results support the concept that not all thyroidectomies need to be drained.

REVIEWER COMMENTS

Another area in general surgery in which drain management is somewhat controversial is postnecrosectomy for infected pancreatic necrosis.[13] Although surgical debridement remains the mainstay of treatment, various techniques of postoperative drainage are employed. Three primary methods of management have emerged. The first includes primary ne-

crosectomy with simple drainage of the peripancreatic space and reexploration as needed. The second method involves necrosectomy with drain placement, open packing, and planned reexplorations. The third main technique includes pancreatic debridement followed by continuous postoperative lavage of the peripancreatic space.[5]

Altemeyer and Alexander[14] originally described the conventional surgical approach of pancreatic and peripancreatic debridement with Penrose/sump drainage. This method of drainage has fallen out of favor recently because of high mortality rates and the need for repeated exploration.[15-17] Its failure can be attributed to the lack of continuous removal of postoperative necrotic debris. If this method of drainage is used, constant awareness of the need for reexploration is required if no clinical improvement is seen.[5]

The open technique was first reported by Davidson and Bradley.[18] The necrotic pancreas is widely debrided, and large bore drains are left in these areas. The wound is then packed, and the abdomen is left open. Multiple planned reexplorations and packing changes are required. The abdomen heals by secondary intention over the drains, which serve to collapse this large potential space. Multiple series[9-11] report a lower overall mortality rate using an open technique instead of a conventional approach, but complications such as bleeding and bowel and pancreatic fistulas are increased because of repeated intraabdominal manipulation.

Though different techniques are described, the principle of necrosectomy with postoperative drainage remains constant. Different methods of drainage exist, but all are intended to drain the residual necrotic material. Whatever the technique, debridement with Penrose drainage, the open technique, or closed system, postnecrosectomy drainage is another example of the varied use of drains in surgery.

reviewed. Treatment included surgical debridement of all necrotic material, intraoperative lavage with 6-l to12-l saline, and placement of 2 large bore, double lumen catheters in the retroperitoneum for continuous postoperative lavage. Initial lavage was at a rate of 24 l per day, and continued until the effluent was clear of necrotic material, with low amylase and lipase levels.

Results: Lavage was continued for an average of 30 days postoperatively. Forty percent of patients required a second operation. Complications included abscess in 21% of patients, bleeding in 21%, and bowel fistulas in 23%. Eight deaths occurred among the 52 patients (15%). The authors reviewed 3 series of closed drainage, and found an overall mortality rate of 19.8%.[6-8] This was nearly comparable to the series of open techniques they reviewed.[9-12]

Conclusions: Necrosectomy and continuous closed lavage protocol is equal to open procedures with respect to the clinical outcome, and superior in terms of the lower demand for technical equipment, TCU therapy, and cost.

PERCUTANEOUS DRAINAGE OF ABDOMINAL ABSCESSES: ARE LARGE-BORE CATHETERS NECESSARY? Rothlin MA, Schob O, Candinas D, Largiader F. Eur J Surg 1998;164:419-424.

Objective: To determine if small-bore catheters (7 Fr.) are as effective as large-bore catheters (14 Fr.) for drainage of intraabdominal abscesses.

Design: Retrospective review from January 1990 to December 1995.

Setting: Zurich University Hospital, Zurich, Switzerland.

Participants: Sixty-four consecutive patients who underwent percutaneous drainage of abdominal abscesses were reviewed. Two types of drains were used, a 7 Fr. pigtail catheter and a 14 Fr. sump drain. All catheters were placed under sterile conditions using ultrasound guidance. Drainage was considered successful if the white blood cell count returned to normal and clinical symptoms resolved. Drainage was considered a failure if clinical symptoms persisted or a leukocytosis persisted after 4 days.

Results: Forty patients had a small-bore catheter placed, whereas a large-bore catheter was placed in 24 patients. Success rates were 85% and 83%, respectively. The highest failure rates were seen in patients with pancreatic abscesses. Excluding these patients, success rates were 94% and 87% for small and large-bore catheters, respectively. No significant differences were seen in complication or recurrence rates.

Conclusions: Small-bore catheters are just as effective as large-bore catheters when draining intraabdominal abscesses. Caution should be taken when draining pancreatic abscesses, because percutaneous drainage tends to fail.

REVIEWER SUMMARY

In the field of surgery, controversy has always surrounded the use of drains. Some surgeons use drains for most intraperitoneal operations, whereas others feel drainage is completely unnecessary.[30] What drains, if any, should be used, when should they be used, and what are some of the potential hazards of drains?

The ideal drain should effectively evacuate the effluent, avoid damaging adjacent tissues, restrict the introduction of infection, and be easily removed when no longer needed.[20] Clearly, if drain usage is selected, the type must be tailored to each situation.

Two main categories of drains exist: passive and active.[20] The Penrose drain is the classic example of a passive drain. These are soft rubber catheters that function by creating a low resistance tract from which material can exit the drained cavity. Active drains function through a closed pressure gradient. A Jackson–Pratt drain has a collapsible bulb at the external end of the catheter to create a negatively pressurized system. The fact that the system is closed helps reduce the possibility of retrograde infection, and it aids in creating tissue apposition. Whether passive or active, a drain's primary function remains evacuation of unwanted material from a space.

Though a valuable tool to the surgeon, drains are not without risks and complications. They can act as a nidus for infection from local tissue irritation and bacterial adherence with retrograde migration. Drains may become obstructed, causing inadequate removal, and, thereby, retention of undesirable material. Physiologic abnormalities occur with massive loss of fluid and electrolytes. Mechanical problems can be seen. Drains may become entrapped, and bowel herniation can occur.

Situations or locations in which drains have been advocated probably include the entire spectrum of surgical disease. Drains have been discussed extensively when used in conjunction with thyroid surgery (drainage of blood), pancreatic debridement (drainage of pus and necrotic material with obliteration of dead space), and the primary treatment of abscesses. As much attention should be paid to the nature of the material to be drained as to the type of drain, because this aspect has just as much bearing on the situation and, certainly, as much impact on the success of the intervention. Blood clots,

REVIEWER COMMENTS

One of the primary uses of drains is for therapeutic drainage of abscesses. Although drainage of intraabdominal abscess cavities is performed widely, drainage of the free peritoneal cavity is virtually impossible. This was noted in the early 1900s by Yates.[19] He observed that "drainage of the intraabdominal cavity is physically and physiologically impossible" because drains become virtually walled off early in the post-operative period by omentum, adhesions, and adjacent serosal surfaces. Their use intraabdominally appears to be effective for draining abscesses, establishing controlled fistulas, and in specific diseases such as appendicitis and diverticulitis where the inflammatory process is localized.[20]

Rothlin and associates' paper supports the use of percutaneous drainage for intraabdominal abscesses, and it challenges the gold standard of open surgical drainage. Smaller catheters appear just as effective as large ones. With the advent of minimally invasive gallbladder procedures, percutaneous drains are also effective in draining bile.[21] Minimally invasive procedures have become a major part of operative surgery, and they now play an important role in the drainage of intraabdominal abscesses.

Although drains are used effectively to treat abscesses, they serve little value in the prevention of infection. The incidence of wound infection of clean wounds is not decreased when either Penrose[22,23] or closed suction drains are used.[24,25] Similar results are seen with clean-contaminated and contaminated wounds.[26-28] Dougherty and Simmons[29] summarized that passive and closed suction drains have little efficacy prophylactically for clean wounds when systemic antibiotics are used. With regard to clean-contaminated and contaminated wounds, passive drains confer little benefit, whereas suction drains may be of benefit in the absence of systemic antibiotics. In all, the prophylactic use of either passive or suction drains does not appear to be validated.

and thus, is poorly drained. Pus drains relatively well, but particulate matter may hinder effective drainage. This should, therefore, temper the selection of drain type.

In summary, many surgeons have both advocated and opposed the use of drains in various situations. Drains are used to eliminate many undesired substances, such as pus, blood, bile, and lymph. Often, no consensus exists as to whether a drain should be used. One needs to understand the different types of drains and types of substances to be drained, as well as the basis behind therapeutic and prophylactic drainage. These concepts can then be applied to individual circumstances. Although definite answers may not always exist, with a generalized understanding of drains, one can then apply these principles to most situations.

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