The Best of the Best—1998

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In an attempt to highlight those articles published in 1998 that contributed most to the better understanding of the practice of clinical surgery, we solicited opinions from a range of surgeons familiar with the literature of their area of expertise. From their thoughtful suggestions, we have distilled this list of “The Best of the Best—1998.” Overall, the articles that have advanced our clinical expertise have been predominantly in the area of critical care.

Our hope is that this list will be helpful to you in staying abreast of significant practice-related innovations.

Gould SA, Moore EE, Hoyt DB, et al. The First Randomized Trial of Human Polymerized Hemoglobin as a Blood Substitute in Acute Trauma and Emergent Surgery. J Am Coll Surg. 1998;187:113-122. In a randomized trial of 44 trauma patients (ages 19-75 years, with a mean Injury Severity Score of 21), human polymerized hemoglobin, a universally compatible, disease-free, oxygen-carrying resuscitative fluid, was administered to 21 patients and red cell transfusion was used as the treatment for 23 patients. There were no serious or unexpected adverse events related to the polymerized hemoglobin (given in doses up to 6 U). Although 40% of the total circulating hemoglobin was in the plasma of the polymerized hemoglobin infusion group, the total hemoglobin was not different between the groups. Thus, polymerized hemoglobin appears to be safe in replacing acute blood loss and can be a useful blood substitute.

After 30 years of investigation, stroma-free polymerized hemoglobin has found its way into the clinical armamentarium.

Rozycki GS, Ballard RB, Feliciano DV, Schmidt JA, Pennington SD. Surgeon-Performed Ultrasound for the Assessment of Truncal Injuries. Ann Surg. 1998;228:557-567. The focused assessment for the sonographic examination of the trauma patient (FAST) is a rapid test that sequentially surveys the pericardial region for hemopericardium and then the right and left upper abdominal quadrants and pelvis for hemoperitoneum in patients with potential truncal injuries. In this report, the examination was performed in 1540 patients (1227 with blunt injury, 313 with penetrating injury) with only 16 false-negative results and 4 false-positive results, for a sensitivity of 83.3% and a specificity of 99.7%. It was most sensitive and specific for the evaluation of patients with blunt abdominal trauma. This ultrasonographic technique should be the initial diagnostic modality for the evaluation of patients with precordial wounds and blunt truncal injuries because it is rapid and accurate, thus leading to immediate surgical intervention when positive in all patients with precordial wounds and in patients with blunt torso trauma who are hypotensive (blood pressure ≤90 mm Hg).

Heald RJ, Moran BJ, Ryall RDH, Sexton R, MacFarlane JK. Rectal Cancer: The Basingstoke Experience of Total Mesorectal Excision, 1978-1997. Arch Surg. 1998;133:894-899. From a district hospital and referral center in England comes a study of 519 surgical patients with proven adenocarcinoma of the rectum treated by anterior resection (n = 463, with 407 patients having total mesorectal excision under direct vision), abdominoperineal resection (n = 37), Hartmann procedure (n = 10), local excision (n = 4), and laparotomy only (n = 3). Ten percent of the patients received preoperative radiotherapy.

Follow-up revealed a cancer-specific survival of all surgically treated patients of 68% at 5 years and 66% at 10 years. The local recurrence rate was 6% at 5 years and 8% at 10 years. In 405 “curative resections,” the local recurrence rate was 3% at 5 years and 4% at 10 years and disease-free survival was 80% at 5 years and 78% at 10 years. Thus, by the technique of mesorectal excision, 2 of 3 patients with rectal cancer can be cured by surgical therapy alone (all stages) and in those undergoing “curative resection,” 4 of 5 patients can experience long-term, disease-free survival. Although total mesorectal excision, as practiced, doubles the operating time, adds to the expense of operation, and is a challenge to surgical skill, it appears to be well worth the effort.

Ivatury RR, Porter JM, Simon RJ, Islas S, John R, Stahl WM. Intra-abdominal Hypertension After Life-Threatening Penetrating Abdominal Trauma: Prophylaxis, Incidence, and Clinical Relevance to Gastric Mucosal pH and Abdominal Compartment Syndrome. J Trauma. 1998;44:1016-1023. Intra-abdominal hypertension is frequent after major abdominal trauma. To define the incidence, prophylaxis, and treatment of this phenomenon and its relevance to gut mucosal pH, multiorgan dysfunction syndrome, and the abdominal compartment syndrome, 70 patients with life-threatening penetrating abdominal trauma were monitored at a level I trauma center. Intra-abdominal pressure was estimated by measuring bladder pressure, and gut mucosal pH was evaluated by gastric tonometry every 4 to 6 hours. Intra-abdominal pressure greater than 25 cm of water was treated by bedside or operating room laparotomy. Two groups were compared: patients with loosely applied abdominal wall mesh closure and those

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with fascial suture closure after appropriate intra-abdominal exploration and treatment.

Of the 45 patients undergoing loose mesh closure, 22% developed intra-abdominal hypertension as opposed to 52% of those undergoing fascial suture closure (n = 25). Of the patients monitored for gut mucosa pH, 11 had intra-abdominal hypertension and 8 (73%) of these patients had normal gastric mucosal pH (7.10 ± 0.2) without exhibiting the classic signs of abdominal compartment syndrome. After abdominal decompression in this latter group, none developed full-blown abdominal compartment syndrome. Multiorgan dysfunction syndrome and death were less frequent in patients without intra-abdominal hypertension and in patients who had loose mesh closures.

Thus, it is postulated that intra-abdominal hypertension causes gut acidosis even before the clinical onset of abdominal compartment syndrome, and if uncorrected leads to splanchnic hypoperfusion, organ failure, and death. Loose closure of the abdomen under circumstances of severe abdominal trauma (by mesh or sterile intravenous bags) may facilitate the prevention of intra-abdominal hypertension and reduce complications.

O’Keefe GE, Gentilello LM, Maier RV. Incidence of Infectious Complications Associated With the Use of Histamine-2-Receptor Antagonists in Critically Ill Trauma Patients. Ann Surg. 1998;227:120-125. A randomized study of 96 patients was conducted to determine the impact of H2-receptor antagonist use on the occurrence of infectious complications in severely injured patients. Sucralfate was given to 47 patients and ranitidine to 49 patients, and all infectious complications were examined. The 2 groups were otherwise similar. Analysis of data revealed that ranitidine use was associated with a 1.5-fold increased risk of developing any infectious complication (128 complications in ranitidine group and 50 in the sucralfate group). These differences remained after excluding catheter-related infections and secondary bacteremia.

The investigators concluded that the use of ranitidine in severely injured patients is associated with a significant increase in overall infectious complications when compared with sucralfate use and thus should be avoided in the prophylaxis of stress gastritis.

Bollaret P-E, Charpentier C, Leoy B, Debouverie M, Audilert G, Larcan A. Reversal of Late Septic Shock With Supraphysiologic Doses of Hydrocortisone. Crit Care Med. 1998;26:645-650. In a prospective, randomized, double-blind, placebo-controlled study, 41 patients with septic shock requiring catecholamine for more than 48 hours were treated with either 100 mg of hydrocortisone intravenously 3 times daily for 5 days or matching placebo. Reversal of shock was defined as a stable systolic arterial pressure (>90 mm Hg) for 24 hours or more without catecholamine or fluid infusion. Of the 22 hydrocortisone-treated patients and 19 placebo-treated patients, 68% and 21% achieved 7-day shock reversal, respectively. At 28-day follow-up, reversal remained higher in the hydrocortisone group. Crude 28-day mortality was 32% for the treated patients and 63% for the placebo patients. Shock reversal within 7 days after the onset of corticosteroid therapy was a very strong predictor of survival. Thus, administration of modest doses of hydrocortisone in the setting of pressor-dependent septic shock for a mean of greater than 96 hours resulted in significant improvement in hemodynamics and a beneficial effect on survival. These results contrast with those of older clinical studies in which dexamethasone demonstrated no positive effects. The use of hydrocortisone in this article raises intriguing questions about the efficacy of alternative steroid therapies, which it is hoped will renew interest in them.

Chen H, Parkerson S, Udelsman R. Parathyroidectomy in the Elderly: Do the Benefits Outweigh the Risks? World J Surg. 1998;22:531-536. To determine the risks and benefits of surgical intervention for primary hyperparathyroidism in the elderly (>70 years old), data from 184 consecutive patients who underwent exploration for this problem were recorded prospectively. Demographic and outcome information revealed that preoperative symptoms of mental impairment, bone disease, and fatigue were more common in the elderly (n = 36), whereas nephrolithiasis was more frequent in the younger patients (n = 148). Elderly patients presented with more advanced disease (chemical studies) but the cure rate, morbidity, and mortality (94.4%, 3.5%, and 0%, respectively) were indistinguishable from those of their younger cohorts. Patient satisfaction was high as well. These results suggest that the benefits of operation outweigh its risks and argue for a lower threshold for referral of the elderly with primary hyperparathyroidism, even the so-called asymptomatic patient, for surgical treatment.

Schoerb PR, Henning JF. Patterns and Problems of Adult Total Parenteral Nutrition in US Academic Medical Centers. Arch Surg. 1988;123:7-12. Recent literature suggests that, except in severely malnourished patients, perioperative total parenteral nutrition (TPN) may show no benefit or sometimes produce adverse effects. One clue to the mechanism of adverse effects of TPN was the correlation between the rate of glucose infusion, and, by indirect calorimetry, the ratio of carbon dioxide produced to oxygen consumed, or the respiratory quotient. A respiratory quotient greater than 1.0 signifies net lipogenesis, a futile metabolic event in a malnourished, hypermetabolic patient whose priorities for energy expenditure do not include fat synthesis.

In a survey of the University Health Systems Consortium, the largest university hospital group and very representative of US academic centers, it was learned that about 75% of institutions reported using TPN formulas with more than 20% dextrose; half used 25% dextrose. In a resurvey that cited specific treatment patterns for abdominal injury, 26% of the institutions gave amounts of glucose in TPN high enough to produce a respiratory quotient greater than 1.0. Thus, it is suggested that when used, a TPN formula with no more than 15% dextrose, administered at a rate to provide no more than 4 mg/kg of glucose per minute, is appropriate.

jery, and thus reduce pulmonary complications and mortality. Fifty-three patients with early acute respiratory distress syndrome, identically supported hemodynamically, were randomized to conventional or protective mechanical ventilation. Conventional ventilation was based on the lowest positive end-expiratory pressure (PEEP) for acceptable oxygenation with a tidal volume of 12 mL/kg and normal PCO₂ (35–38 mm Hg). Protective ventilation involved end-expiratory pressures above the lower inflection point on the static pressure-volume curve, a tidal volume of less than 6 mL/kg, driving pressures of less than 20 cm of water above the PEEP value, permissive hypercapnia, and preferential use of pressure-limited ventilatory modes.

After 28 days, 11 (38%) of 29 patients in the protective-ventilation group had died, as compared with 17 (71%) of 24 in the conventional ventilation group (P = .001). The rates of weaning from mechanical ventilation were 66% in the protective-ventilation group and 29% in the conventional ventilation group (P = .005). The rates of clinical barotrauma were 7% and 42%, respectively, despite the use of higher PEEP and mean airway pressures in the protective-ventilation patients. As compared with conventional ventilation, the protective strategy appeared advantageous despite the fact that it was not associated with a higher rate of survival to hospital discharge (many deaths were related to the severity of baseline disease of patients). These data must be confirmed by multicenter trials, but it is suggested that the use of more liberal PEEP values be considered in dealing with this difficult patient population.

Pruitt BA Jr, McManus AT, Kim SH, Goodwin CW. Burn Wound Infections: Current Status. World J Surg. 1988;22:135-145. A burn wound represents a susceptible site for opportunistic colonization. Burn wound infections can be classified on the basis of causative organism, depth of invasion, and the tissue response. Diagnostic procedures and therapy must be based on an understanding of the pathophysiology of the burn wound and the pathogenesis of the various forms of burn wound infection. The time-related changes in the predominant flora of the burn wound from gram positive to gram negative recapitulate the history of burn wound infection. Early surveillance has permitted diagnosis of gram-positive cellulitis and its susceptibility to penicillin has eliminated this once common threat. Even burn wound colonization by resistant species of *Pseudomonas aeruginosa* can effectively be managed by topical antimicrobial chemotherapy and early burn wound excision. The burn wound must be examined in its entirety on a daily basis and any change evaluated by biopsy (quantitative and histologic analysis are necessary to establish invasive infection). The characteristic histologic changes delineate the bacterial, fungal, or viral infection and facilitate appropriate therapy (change of medicinals and/or removal of infected tissue). Even after the wounds of extensively burned patients have healed, burn wound impetigo (*Staphylococcus aureus*) may occur, requiring surgical debridement. Current techniques of burn wound care have significantly reduced the incidence of invasive burn wound infection, altered the organisms causing the infections that do occur, increased the interval between injury and the onset of infection, and reduced infection mortality—thus increasing burn patient survival.

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**ARCHIVES OF INTERNAL MEDICINE**

Treatment of Intermittent Claudication With Physical Training, Smoking Cessation, Pentoxifylline, or NafronyI: A Meta-analysis

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**Background:** There is no consensus on the efficacy of physical training, smoking cessation, and pharmacological therapy (pentoxifylline or nafronyl oxalate) in the treatment of patients with intermittent claudication at Fontaine stage II of disease.

**Methods:** A MEDLINE and manual search was used to identify relevant publications. Uncontrolled or retrospective studies, double reports, and trials without clinically meaningful outcomes were excluded. Included studies were graded level 1 (randomized and double- or assessor-blind), level 2 (open randomized), or level 3 (nonrandomized). Pain-free and total walking distance were the main outcomes considered; when feasible, end-of-treatment results were combined with appropriate meta-analytical procedures.

**Results:** In 5 level 2 studies, physical training increased pain-free and total walking distance significantly (139.0 m [95% confidence interval (CI), 31.0 to 246.9 m] and 179.1 m [95% CI, 60.2 to 298.1 m], respectively). In a level 3 study, smoking cessation resulted in a nonsignificant increase in total walking distance of 46.7 m (95% CI, ~19.3 to 112.7 m). In 6 level 1 studies, pentoxifylline increased both pain-free and total walking distance by 21.0 m (95% CI, 0.7 to 41.3 m) and 43.8 m (95% CI, 14.1 to 73.6 m), respectively. In 4 level 1 trials, nafronyl significantly increased pain-free walking distance (38.6 m [95% CI, 30.4 to 48.9 m]) and total walking distance (71.2 m [95% CI, 14.1 to 73.6 m]).

**Conclusions:** Physical training increased pain-free and total walking distance in level 2 studies. Only level 3 studies support the usefulness of smoking cessation. In level 1 studies, pentoxifylline and nafronyl increased pain-free and total walking distance, but the average effects were relatively small. (1999;159:337-345)

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