

# Hypermetabolism Correlated with Subsequent Stricture Formation in Esophageal Caustic Burn Injury in Children

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Our study aimed to explore prognostic factors using a severity score system including metabolic condition related to subsequent stricture formation U Yf esophageal caustic burn and assess the VbY lg or XY Wlg of steroid use for these patients.

## Materials and Methods

We retrospectively investigated the children admitted to Chang Gung Children's Hospital for corrosive ingestion between July 1993 and June 2013. Ystudy was approved by Institutional Review Board (IRB No. 104-6861B) of Chang Gung Memorial Hospital. Patients' demographic information, nature of the caustic agent, medical records with timing of medical access, vital signs, clinical manifestations, diagnostic procedures with endoscopic bX|b| gZmedical management, subsequent complications, and following bU outcome were reviewed. Laboratory studies were evaluated, including the peripheral leukocyte count and blood electrolytes, liver and renal functions, and sugar level at admission. Delayed management was XY bYX as initial treatment more than 6 h U Yf caustic ingestion. Yseverity of esophageal injury on upper gastrointestinal endoscopy was Wlgj YX as follows: grade 0, negative bX|b| g/ grade 1, injury limited to erythema and edema; grade 2, ulceration with necrotic tissue and white plaque; and grade 3,

Steroid used (+/-)	10/4	20/23	0.105
Antibiotics used (+/-)	11/3	23/20	0.097
Agent ingested (Alkaline/Acid)	13/1	35/8	0.427
Grade of Injury (high/low)	14/0	23/20	0.001

**Table 2** Risk Factors Associated with Esophageal Stricture 5 Yr Corrosive Injury in Children.

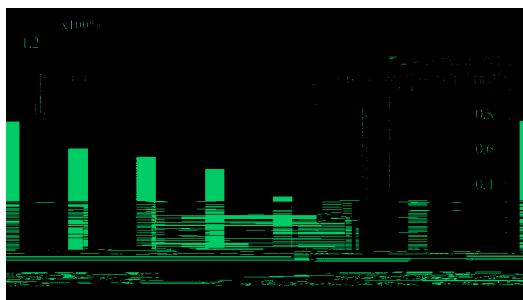
Upper gastrointestinal endoscopy was performed in every patient within 48 h U Yf the event. Antibiotics and corticosteroids were used

Two patients bU accepted gastrostomy owing to inadequate Y VM for nutrition supplement under dilatation and another one operated for esophageal reconstruction due to multiple stricture sites with one esophageal perforation as complication of dilatation. Only 2 patients accepted short duration (less than 1 month) parenteral nutrition in the acute phase of injury. Sequentially, four patients (28.6%) had growth retardation and failure to thrive due to undernutrition bU mwith 3 of them retarded both body weight and height. None of these patients had gross developmental delay.

### Score system and Hypermetabolism assessment in esophageal stricture patients

Focused on the hypermetabolic presentations of the 14 patients with stricture formation (Table 3), 13 (92.9%) manifested at least 1 of all the signs, and there were 12 (85.7%) with marked leukocytosis, 11 (78.6%) with hyperthermia, and 8 (57.1%) with hyperglycemia and the highest prevalence of marked leukocytosis. Eight (57.1%) patients presented all the 3 hypermetabolic signs, 10 (71.4%) presented at least 2 of 3 signs.

According to the assessment by our scoring system (Table 1), the positive prediction of stricture formation was: 3 of 4 patients (75%) scored 6, 6 of 10 patients (60%) scored 5 or higher, 11 of 20 patients (55%) scored 4 or higher, 14 of 29 patients (48%) scored 3 or higher, and 14 of 43 patients (33%) scored 2 or higher. Ynegative prediction of stricture formation was: 42 of 53 (79%) patients scored less than 6, 39 of 47 (83%) patients scored less than 5, 34 of 37 (92%) patients scored less than 4 (Figure 1).



**Figure 1:** Y positive and and negative predictive values related to score accessment for stricture formation U Yf esophageal comosive

4. Abramson AL (1978) Corrosive injury of the esophagus. Result of ingesting some denture cleanser tablets and powder. *Arch Otolaryngol* 104: 514-516
5. Feldman M, Iben AB, Hurley EJ (1973) Corrosive injury to oro-pharynx and esophagus. 9 consecutive cases. *Calif Med* 118: 6-9
6. Anderson KD, Rouse TM, Randolph JG (1990) A controlled trial of corticosteroids in children with corrosive injury of the esophagus. *N Engl J Med* 323: 637-640
7. Vyles D, Sinha M, Rosenberg DI, Foster KN, Tran M, et al. (2014) Predictors of serious bacterial infections in pediatric burn patients with fever. *J Burn Care Res* 35: 291-295
8. Gore DC, Chinkes D, Sanford A, Hart DW, Wolf SE, et al. (2003) Effect of fever on the hypermetabolic response in burn-injured children. *Arch Surg* 138: 169-174
9. Murphy CV, Yarr R, Wisler J, Miller SF (2013) Relationship between acute and chronic hyperglycemia and outcomes in burn injury. *J Burn Care Res* 34: 109-114
10. Gore DC, Chinkes DL, Hart DW, Wolf SE, Herndon DN, et al. (2002) Hyperglycemia exacerbates muscle protein catabolism in burn-injured patients. *Crit Care Med* 30: 2438-2442
- 11.