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A STUDY OF CLINICAL AND ENDOSCOPIC PROFILE OF ACUTE CORROSIVE INJURY OF THE UGI TRACT IN ADULT POPULATION - A SINGLE CENTRE STUDY

Gastroenterology

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ABSTRACT

INTRODUCTION –Corrosive injuries are one of the important public health issues especially in developing countries like India causing a spectrum of complications.

AIM–To review clinical and endoscopic findings of patients with acute corrosive injury and management of these patients.

METHODS–In this prospective study,clinical data of 61 patients were collected from July 2016 to July 2017 who came at our centre with corrosive ingestion within 48 hrs.Full clinical examination was done and chest x ray was taken.Patients with no evidence of perforation underwent upper GI endoscopy and initial conservative management was instituted.Corrosive injuries were graded by Zargar's classification.

RESULTS-Out of 61 patients, complete evaluation was possible only in 53 patients.37 male and 16 female patients were evaluated and mean age was 29 years. Mean time interval of presentation was 17 hours and volume of corrosive ingestion was 20 to 150ml.Most common corrosive in our study were acids that included hydrochloric acid(n=28), phenol(n=9),sulphuric acid (n=2),nitric acid(n=2),aqua regia (n=1)alongwith alkali(n=9)and 2 cases of kerosene ingestion.Five cases were accidental while 48 cases were of suicidal ingestion.Most common clinical feature in our study were oropharyngeal injuries(n=43),epigastric pain(n=34),sialorrohea(n=31),vomiting(n=30),odynophagia(n=25)and dysphagia(n=23).46 patients had esophageal injuries(grade I= 27,IIa = 9, IIb = 5, III=5) while 40 patients had gastric injuries(grade I = 18, IIa = 9, IIb = 5, III =8).Ryle's tube(RT) insertion were done in 6 patients with grade IIb and III injuries. Patients who came for review after 4 to 8 weeks improved spontaneously with grade I and IIa injuries.5 patients with IIb and III injuries required feeding jejunostomy initially while all 6 patients with RT required dilatation after 4 weeks.

CONCLUSION –Patients with acute corrosive injury can be assessed reliably and accurately by upper GI endoscopy and proper clinical examination and managed accordingly.

KEYWORDS

Acute corrosive injury,endoscopy,grade

INTRODUCTION

Caustic injury is caused mainly by strong acidic or alkaline agents. Acid ingestion is common in Asia including India where hydrochloric acid and sulphuric acid are easily available as toilet cleaners whereas lye or alkaline corrosive injuries are seen more in western countries[1]. The majority of cases worldwide are the result of accidental ingestion of caustic substances by children[2]. Remaining cases are adults mainly suffering from psychiatric problems, attempting suicide or alcoholics[3] . Corrosive injuries are also becoming one of India's public health issues due to fatal short term as well as long term complications associated with it. Both accidental and suicidal ingestion is due to careless storing of chemicals and free availability of the caustic agents respectively[1].

The relative extent of esophageal and gastric injury largely depends on the nature of the corrosive ingested. The best and most common method to stratify patients with acute corrosive ingestion is upper gastro duodenal endoscopy. Endoscopy can be performed safely at any time within 48 hours of ingestion, provided the patient is stable and there is no evidence of perforation. Endoscopy should be avoided if time of ingestion is more than 3 days and should be done after 3-4 weeks as there is sloughing of tissues with increased danger of perforation. On the basis of endoscopic findings, corrosive injury have been classified into grades by Zargar. Most perforations and fatalities in the acute phase occur in patients with grade IIIb injury, while strictures may develop in patients with grade IIb or higher grade of injury. In children injury is frequently and relatively minor due to smaller amounts of ingested substance in contrast to adults (especially after suicide attempts) where injury is often more severe [4-5]. This is due to larger quantities of the caustic substance ingested . Injury caused by alkali or acid results in a different injury pattern. Alkali causes almost no irritation to the oral cavity and therefore larger volumes are swallowed leading to progressive liquefactive necrosis injury. In the stomach due to the neutralizing effect of gastric acid alongwith easy passage through the pylorus there is limited exposure time of the gastric and duodenal mucosa which in turn results in less severe injury. Acids are irritating and induces pain immediately upon contact with oral mucosa. They lack viscosity but can induce pyloric spasm. Acids are not neutralized by endogenous gastric secretion. Due to lack of viscosity the transit time through the esophagus is rapid and in most cases the damage to the esophagus is limited. On the other hand the duration of exposure to the gastric mucosa is extended leading to coagulative necrosis[6-7]. Clinical presentation is highly variable and patients should be examined completely. Patients with minimal ingestion may be asymptomatic while others may experience oropharyngeal, retrosternal or epigastric pain. Difficulty in breathing, hoarseness and stridor may suggest laryngeal injury. Dysphagia, odynophagia and excessive salivation are often suggestive of esophageal injury while abdominal pain,vomiting and hematemesis may often suggest gastric injury. Symptoms and signs of perforation may include continued pain, peritonitis, tachycardia, persistent leukocytosis, acidosis and pleural effusion[8-11]. Delayed complications include stricture and fistula formation (tracheobronchial, gastro colic or even entero-aortic). Malignant transformation is a long term risk of corrosive injury.

Our aim regarding this study is to:-

- Collect epidemological data on corrosive injury
- Study clinical presentatation after ingestion
- Do Endoscopic grading of esophageal injury and gastric injury
- To set target of management after initial evaluation

MATERIALS AND METHODS

It was a prospective study where a total of 61 Patients in last 1 year (25-07-2016 to 25-07-2017) who presented to Medical Gastroenterology OPD for acute corrosive injury were evaluated. Initially complete history was directed to the type ,amount and purpose of corrosive intake followed by full clinical examination alongwith assessment of vitals was done. ENT evaluation was done. Routine blood chemistry including CBC,LFT and RFT was done. Imaging with x ray chest and

abdomen were done to rule out perforation . Patient with stable vitals underwent endoscopy within 48 hrs of alleged corrosive ingestion. Out of 61 only 53 underwent endoscopy. 4 patients were haemodynamically unstable at the time of presentation with suspicion of perforation so were referred to surgical department, 2 patients had severe oro-pharyngeal edema and friability causing difficult mouth opening while 1 patient denied informed consent for endoscopy. In this study we have only included the patients only who underwent endoscopy at our centre. The injury was graded according to the modified criteria given by Zargar and colleagues into I, Iia, Iib, IIIa, IIIb, and IV .

All patients were initially managed conservatively after endoscopy .Upper gastrointestinal endoscopy was repeated at the end of 4-8 weeks in most of the patients especially with grade IIb injury or more to assess the degree of healing and to look for any complications. These patients who developed strictures were also subjected to barium studies (barium swallow and meals) during the early follow up period after 4-6 weeks .

Inclusion criteria

Age>=13 yrs;Patients who presented witihin 48 hrs of corrosive ingestion;Patients with stable vitals and no perforation;Patients with normal chest x ray and insignificant ECG findings;Patient willing for endoscopy with written informed consent.

Exclusion criteria: Age<=13 yrs ;Patient who presented after 48 hrs ;Patient not willing for endoscopy; Patients with unstable vitals or evidence of perforation; Patients with severe oro- pharyngeal injuries.

Zargar's grading
Grade I : edema and erythema
Grade IIA : Hemorrhages, erosions, blisters, superficial ulcer, exudates (patchy or linear)
Grade IIB : Circumferential lesions
Grade IIIA : Small scattered areas of necrosis.
Grade IIIB : Multiple deep brownish-black or gray ulcers with extensive necrosis.
Grade IV : Perforation

RESULTS

Total no of patients were 53 of which males were 37 and females were 16. The Mean age was 29 yrs. The duration from ingestion to time of presentation ranged from 6hr to 32 hr. Mean time of presentation was 17 hrs. It was difficult to know the exact amount of corrosive consumed but range of volume ingested was between 20ml to 150ml.The total number of patients with type of corrosive ingestion were acid(n=42),alkali(n=9) and others(n=2).

The different forms of corrosive ingested alongwith number of patients and their respected percentage of distribution (n,%)is shown in the pie chart below[Fig 1]:-

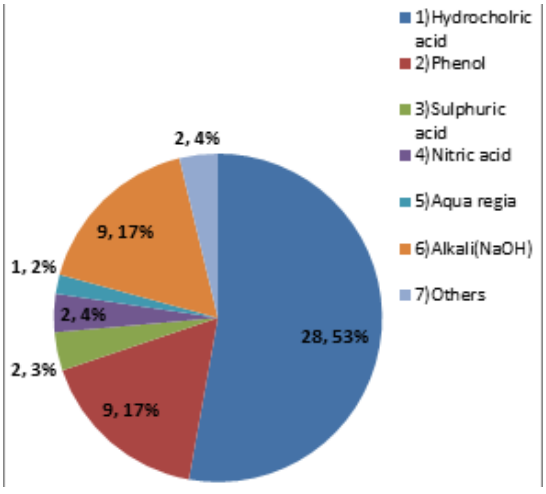

Figure 1

This study comprised mostly adults with 48 patients with suicidal motive(91% patients) and rest 5 accidental(9% patients). All patients consumed corrosive in liquid state available locally.The clinical presentation of acute corrosive injury included many symptoms but majority presented with sialorrohea which was seen in 31 patients and Odynophagia comprising 25 patients.Dysphagia was present in 23,Nausea and vomiting in 30,Chest pain in 30,Abdominal pain in 34,Melena in 1,Hematmesis in 18,Regurgitation in 2,Cough in 3,Oral cavity injury(involving either lips, tongue, buccal mucosa, soft palate, hard palate or pharynx) in 43 and Fever in 1 patient.

Physical examination revealed abdominal tenderness in 30 patients.

Endoscopy findings- Upper GI endoscopy to assess the extent of injury & severity of injury was done in 53 patients out of 61.

The number of patients with Esophageal injury is given in the table below:-

Grade of injury	Number of patients	Percentage
0	7	13
1	27	50
2a	9	16
2b	5	9
3a	3	5
3b	2	3
4	0	0

The number of patients with Gastric injury is given in the table below:-

Grade of injury	Number of patient	Percentage
0	13	24
1	18	33
2a	9	17
2b	5	9
3a	5	9
3b	3	5
4	0	0

Graphs shown below compare the number of patients with grade of acid injury to esophagus vs stomach[Fig 2,3]

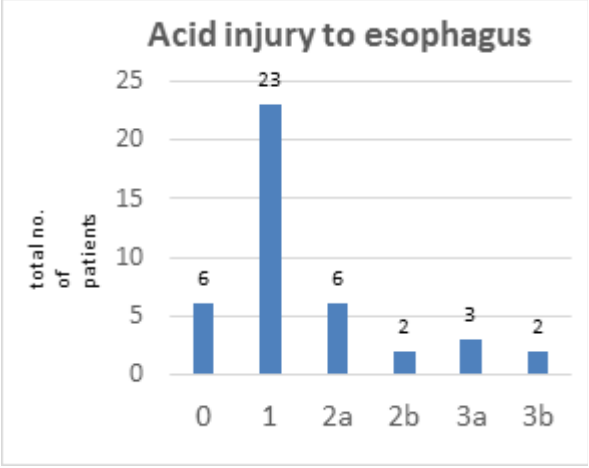

Figure 2

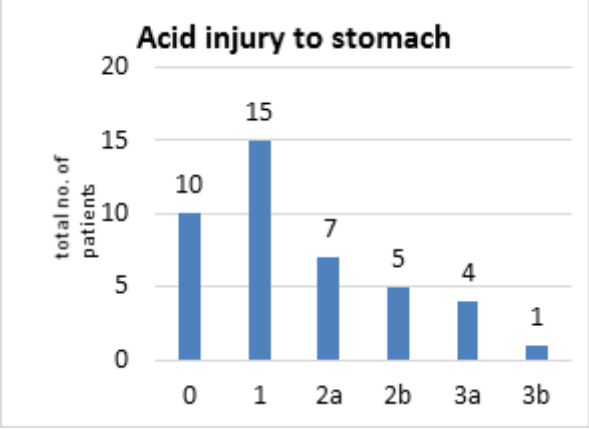

Figure 3

Graphs shown below compares the number of patients with grade of

alkali injury to esophagus vs stomach[Fig4,5]

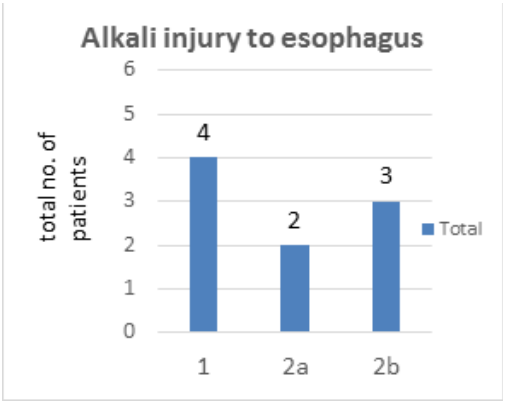

Figure 4

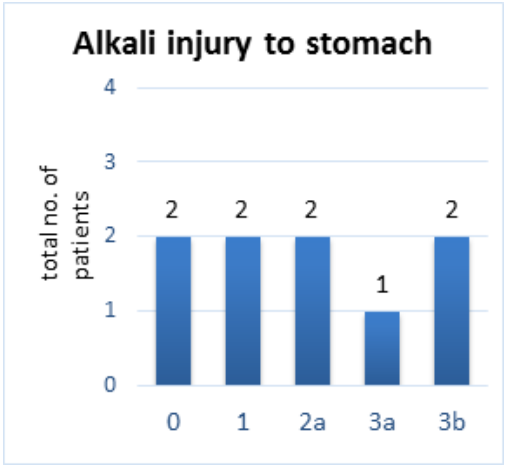

Figure 5

Scope could not be passed into duodenum in 13 patients due to pylorospasm.

12 patients with full stomach had severe esophageal injury, while only 6 patients with empty stomach had severe esophageal injury. 6 patients on full stomach had severe gastric injury, while 16 patients on empty stomach had severe gastric injury . 4 of the 10 patients with no oral injury had esophageal and gastric injury, of which 2 had severe grades of injury.

Thus, a normal oral cavity may not exclude upper gastro intestinal injury.

Management of patients

Patients with mild to moderate grades of injury: 36 patients had mild to moderate injury and were managed conservatively with IV fluids, nil orally, alongwith PPIs in symptomatic patients for first 48 – 72 hours. No antibiotics were used.Gradually patients were put on oral feeds starting with liquids & discharged subsequently.

Patients with severe grade of injury: 12 patients had severe injury All the patients were kept on nil orally and were started on IV fluids, proton pump inhibitors 40mg IV BD and I.V. ondansetron for vomiting with those IIB & IIIA injury. Patients were started oral feeds after 48 hours of which 11 patients did not tolerate oral feeds for whom naso gastric tube placement and feeding was done in 6 patients and 5 patients required feeding jejunostomy.

Repeat Endoscopy after 4-8 Weeks:- Of 53 patients only 30 patients turned up for repeat endoscopy.

Patients with Esophageal injury : All patients with grade IIIB esophageal injury(n=2) developed stricture of lower 1/3 esophahus . 2 of 3 patients with IIIA injury developed stricture lower 1/3 esophagous; in 1 patient there was complete healing . 2 of 5 patients with IIB injury developed stricture, in 3 patients endoscopy was normal, in 1 patient there is a grade IIA injury. Patient with IIA injury showed no residual injury.

Patients with gastric injury: 1 patient with grade 3b injury developed antral stricture and was managed by surgery.

DISCUSSION

Due to easy availability of corrosive agents the incidence of corrosive injury is increasing in India. In our study hydrochloric acid was most common corrosive followed by sulphuric acid. In studies by Zargar et al[10] HCL was the commonest acid ingested, where as in series of Dilawari et al[12] it was sulphuric acid. Since we took only adult population there was a high rate of corrosive ingestion due to suicidal intent i.e. >90%. Similar findings were present in one Indian study by Siva Kumar et al [13] i.e. 88.6% ingested with suicidal intension. Most of the patients presented within 48 hours of corrosive ingestion with mean interval between ingestion and admission being 17 hour while in study done by Dilawari et al[12] the mean interval was 14 hours. In our study patients the esophageal involvement is 86.79% while gastric involvement is 75.47%. In a similar study by Shiva Kumar et al[13] 69.2% had esophageal & 65.4% had gastric involvement. Sailorrhea (58.49%),odynophagia(47.16%) & dysphagia (43.39%) were the commonest symptoms encountered. Where as in study by Shiva Kumar et al[13] dysphagia was the commonest symptom (97.1%). Grade III injuries were present in 15% of our patients, whereas in study by Shiva Kumar et al[13] grade III injuries were present in 46.2%. Five patients needed to be subjected for feeding jejunostomy. In this study there is mild increased severity of esophageal and gastric injuries in those who consumed on full stomach in comparison who took on empty stomach. In our study symptoms & physical examination were unreliable in most cases in determining the severity or extent of injury. All patients with minor injuries recovered without any sequel, where as those with sever injury developed acute & late complications.

In the present study nasogastric feeding was employed in most patients with severe injury. Feeding jejunostomy was done in five patients with severe injury.

In our study all 53 patients survived . Unfortunately initially 2 patients out of 4 who were referred to surgery initially on suspicion of perforation for whom endoscopy couldnot be done died during treatment. Overall mortality was 12.2% & 18.7% in studies by Zargar et al[10] & Dilwari et al[12].

Steroids were not used in our study. I.V. fluids and proton pump inhibitors were used in those with severe injuries for severe pain & for decreasing acid reflux respectively.

The extent of injury can be estimated by endoscopy. Grade I injury involves only the mucosa associated with localized redness and edema. Grade II injury involves the mucosa and sub- mucosa with blister formation. Grade III injury are characterized by a transmural involvement with findings of extensive ulceration and necrosis [14-15]. The grade of injury on endoscopic assessment appears to closely correlate with urgency for surgical intervention and the development of subsequent complications. It seems from our study that finding of an IIa or lesser grade injury resulted in a complication free clinical course while grade IIb and III may progress and result in the development of late complication sometimes with the need for urgent surgical intervention[8].

Due to development of tissue edema and inflammation, delayed endoscopy (>48 h) should be avoided because of increased risk of perforation. Recently some studies supports the accuracy of CT scan as a diagnostic tool with 75% sensitivity and 90% specificity in determining injury grade, need for surgical intervention and ability to predict complications[16].

Treatment of patients after ingestion of caustic material should follow basic principles of management. Airway management is the most important as edema may develop with laryngeal involvement leading to upper airway compromise. Early intubation should be considered in patients with signs and symptoms of upper airway compromise.

Most patients with significant injury can be treated with naso-gastric tube placement which can be inserted after initial endoscopy. The theoretical advantage of this practice is to maintain luminal integrity, minimize stricture formation, and provide a continuous route for enteral nutrition but there is no true evidence to support it[17].

Antibiotics should be used only when infection is suspected(aspiration

or perforation)or when steroid treatment is needed[18] .

Steroid administration may reduce collagen formation and eventually stricture formation but many clinical trials have failed to prove this[19-21]. In current clinical practice steroid are used if patients presents with established respiratory tract edema.

Peritonitis and presence of pneumoperitoneum or any other clinical or radiological evidence of esophageal or gastric perforation or bleeding are indications for immediate surgical intervention[22-23]. The most common late complication of corrosive injury is gastric outlet obstruction and esophageal stricture. Strictures usually develop within 8 weeks after the ingestion but stricture formation as early as 3 weeks after or as late as one year after the caustic material ingestion were reported[24].

Endoscopic dilation should be avoided within the early 3-4 weeks after the injury because of the high risk of perforation. Recurrent strictures needing esophageal replacement is significantly more common after delayed dilatation. Endoscopic dilatation of a stricture 4-6 weeks after corrosive is considered safe. Dilatation of a stricture can be carried out with balloon or Bougie dilators. Bougie dilators are considered more reliable than balloon dilators in consolidated and fibrotic strictures. Long strictures should be treated surgically. The interval between dilatations is usually 3-4 weeks[25] . For esophageal stricture, partial or total esophagectomy with gastric pull up or colonic interposition should be considered. The surgical treatment for gastric outlet obstruction is simple pyloroplasty for moderate strictures and gastrojejunostomy or partial gastrectomy for more extensive stricture[26-28.]

CONCLUSION

India has one of the highest rates of corrosive injury with a preponderance of adult population due to suicidal intent. Physical signs and symptoms should not be the criteria to judge the extent of caustic injuries. Caustic ingestion may lead to severe life threatening injuries. Current trends in the evaluation and management of patients sustaining corrosive injury lay focus on a more conservative algorithm. Endoscopic evaluation of the depth of injury is still one of the best methods and considered hallmark to set target of management strategy . Emergency surgery should be reserved only for patients with perforation or bleeding. Non-operative management for the others will result in better early and long term outcomes.We believe that clinical judgment, selective use of investigational tools and early treatment can prove very effective. The role of CT and late outcome of non-operative management should be evaluated in multicenter prospective studies.

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