Original Research Paper

Volume-9 | Issue-8 | August - 2019 | PRINT ISSN No. 2249 - 555X

Ayurveda

EVALUATION OF GASTROPROTECTIVE ACTIVITY OF YASTIMADHU CHURNA IN PYLORUS LIGATED GASTRIC ULCER IN WISTAR ALBINO RATS

Dr. Ashanka Bhardwaj	MDS(Oral pathologist), jammu
Dr. Pooja Gupta	M.S (ayu) Assistant professor,Jammu institute of ayurveda and research nardini, jammu, india
Dr. Sukrant Sharma*	M.S (ayu) Assistant professor, Jammu institute of ayurveda and research nardini, jammu, india *Corresponding Author
Dr. Sarabjeet Kour	P.G scholar, Jammu institute of ayurveda and research nardini, jammu, india

ABSTRACT Peptic ulcer is a common disease which is caused due to break in the barriers of gastric mucosa against the acid erosions with pain as a chief symptom. Peptic ulcers can be corelated to parinaam and annadrava shoola. Yastimadhu has Sothanashaka,Vranaropana, Pittajit and wound healing properties. Therefore it may be effective in treatment of peptic ulcers. Preventive activity of the yashtimadhu in the peptic ulcers was studied on experimental albino rats. Ulcers were introduced by shay's method of pyloric ligation. Ulcer index, gastric contents for acidity, ph, protein and carbohydrate contents and peptic activities were checked. In the end of the study it showed less tissue damage in histopathological examination as compared to control group. The cytoprotective action of the yashtimadhu helps in the healing of the ulcer. Thus aqueous extract of yashtimadhu choorna proves to be a promising drug in the management of peptic ulcers.

KEYWORDS : Peptic ulcers, Yashtimadhu powder, Albino rats, Pyloric ligation.

INTRODUCTION

Peptic ulcer disease is a problem of the gastrointestinal tract characterized by mucosal damage secondary to pepsin and gastric acid secretion. It usually occurs in the stomach and proximal duodenum less commonly, it occurs in the lower esophagus, the distal duodenum, or the jejunum, as in unopposed hypersecretory states such as Zollinger-Ellison syndrome, in hiatal hernias (Cameron ulcers) or in ectopic gastric mucosa (e.g. in Meckel's diverticulum). Acid hypersecretion, Helicobacter pylori (H.pylori) infection, the use of nonsteroidal anti-inflammatory drugs (NSAIDs), smoking, alcohol intake and excessive use of oily and spicy food are the predominant causes of peptic ulcer. The treatment includes medical and surgical management. Long term use of Proton Pump Inhibitors (PPIs), H2 receptor inhibitors, antimicrobials and cytoprotective agents is associated with their own side-effects eg. atrophic gastritis and compensatory hypergastrinemia which has induced proliferation of parietal cells and gastric carcinoid tumours in rats[1]. Indiscriminate use of antimicrobial agents for eradication of H.pylori has lead to its resistance and therefore it is becoming harder to eradicate[2]

Yastimadhu has been described by Acharya Susruta in Kakolyadi gana, and their paste is said to possess excellent wound healing properties. It is said to be Sothanashaka, Vranaropana & Pittajit. So, the present experimental work has been taken up to study the gastroprotective activity of Yastimadhu churna. The method adopted in this study is the experimental induction of gastric ulcers by pylorus ligation to simulate the conditions of excess acid secretion and collection in the gastrum to cause the ulceration due to irritation because of hyperacidity.

Methods

Materials used:

A. Test drug: Aqueous extract of Yastimadhu Churna prepared in S.D.M. Centre For Research In Ayurveda And Allied Sciences from Yastimadhu Churna manufactured by Shri Dharamasthala Manjunatheswara Ayurveda Pharmacy, Udupi, Karnataka .

B. Standard drug: Omeprazole tablets.

C. Experimental animals: 24 wistar strain albino rats weighing between 200 ±40g were selected for animal study.

DOSE FIXATION

The acute oral of AYMC (Aqueous Extract Of Yashtimadhu Choorna) was determined by following OECD guidelines 425, using AOT software.

Dose Selection of Test Drug

The dose of test drug (AYMC), was selected based on the LD50 derived from Acute Oral Toxicity Test. In the present study, we have selected two dose levels, i.e.

1/10th and 1/5th of LD50. So it was found to be 200mg/kg. body weight (TED) & 400mg/kg. Body weight (TED X 2) was used throughout the experimental period.

Dose of the Standard Drug Omeprazole (STD) was administered in the dose of 20mg/kg body weight.[4]

Route of Drug Administration: The test drug was administered as a suspension using 0.5% CMC, vehicle control rats were administered with 0.5% CMC according to the body weight of animals (1ml/200g body weight) by oral route using oral gavage.

AYMC was administered to experimental animals to evaluate its preventive action in peptic ulcers by assessing ulcer index, volume of gastric contents, total carbohydrate content, total protein content & peptic activity.

Methodology

In this study, selected animals were grouped into 4 different groups randomly irrespective of sexes and each group comprised of six animals.

1. GROUP 1 – Control with 0.5% CMC (Carboxy methyl cellulose) solution.
2. GROUP 2 – Standard drug (STD) with 0.5% CMC solution.
3. GROUP 3 – AYMC in therapeutic test dose (TED) with 0.5% CMC solution.
4. GROUP 4 – AYMC in double therapeutic test dose (TED2) with 0.5% CMC solution.

All the Four groups had free access to food & water ad libitum for first seven days, along with standard drug. Therapeutic test dose drug & double therapeutic test dose drug were administered to the respective group. On 8th & 9th day animals were fasted for 40 hours but allowed for free access to water ad libitum.

On ninth day, at the end of 40h the pylorus will be ligated under Pentobarbitone 35mg/kg I.P. anaesthesia as per Shay et al. On the ventral part of abdomen, a small midline incision was made just below and lateral to the xiphoid process. Pyloric portion of the stomach was

slightly lifted out avoiding traction to the pylorus or damage to its blood supply. The pylorus was ligated with cotton thread and stomach was replaced carefully. The incision was closed with interrupted sutures in layers. The animals were deprived of both food and water during the postoperative period and were sacrificed under anaesthesia at the end of ten hour after pyloric ligation procedure.

The abdomen was opened and a ligature was placed around the oesophagus; stomach was removed and the contents were drained into tubes after making a small nick along the greater curvature adjacent to the pyloric ligation. The stomach was opened along the greater curvature & was washed under the running tap water. Then it was placed on the glass slide & observed for ulcers[3]. Parameters fixed to assess the anti-peptic ulcer activity are the volume and pH of the gastric juice, ulcer index, free and total acidity, total carbohydrate content, total protein, total carbohydrate to protein ratio, peptic activity, antioxidant study and histopathological examination of the section of the stomach of the rats.

RESULTS AND INTERPRETATION

Table 1a: Effect of test drug (AYMC) on Volume of Gastric Juice

Group	Gastric volume (ml)	% change
Ulcer Control	4.17 ± 0.56	
Standard(Omeprazole)	5.02 ± 0.44	20.38 ↑
TED (AYMC)	5.88 ± 0.69	41.0 ↑
TED 2 (AYMC 2)	4.82 ± 0.90	15.58↑

Table 1b: Effect of test drug (AYMC) on Ulcer Score

Group	Ulcer Score	%change
Ulcer Control	21 ± 4.76	
Standard(Omeprazole	4.5 ± 0.96 **	78.57 ↓
TED (AYMC)	7.66 ± 0.77 *	63.52↓
TED 2 (AYMC 2)	5.0 ± 1.22 **	76.19 ↓

Table 1c: Effect of test drug (AYMC) on Free Acidity

Group	Free Acidity(mEq/L)	%change
Free acidity	23 ± 2.61	
Standard(Omeprazole	16.5 ± 2.77	28.26
TED (AYMC)	17.66 ± 4.45	23.21↓
TED 2 (AYMC 2)	21.14 ± 4.07	8.08↓

Table 1d: Effect of test drug (AYMC) on Total Acidity

Group	Total Acidity(mEq/L)	%change
Ulcer Control	40.5 ± 3.11	
Standard(Omeprazole	40.5 ± 2.34	0
TED (AYMC)	37 ± 3.41	8.64↓
TED 2 (AYMC 2)	42 ± 4.98	3.70 ↑

Table 1e: Effect test drug (AYMC) on Total Carbohydrate

Group	Total Carbohydrate (µg/ml)	%change
Ulcer Control	610.66 ± 42.60	
Standard(Omeprazole	485.33 ± 16.86*	20.52 ↓
TED (AYMC)	533 ± 60.91	12.71 ↓
TED 2 (AYMC 2)	481.14 ± 41.56*	21.20↓

Table 2a: Effect of test drug (AYMC) on Total Protein

Group	Total Protein (µg/mL)	% change
Ulcer Control	17236.5 ± 916.06	
Standard(Omeprazole	5507.66 ± 386.88***	68.04↓
TED (AYMC)	11246.16 ± 1506.77**	34.75↓
TED 2 (AYMC 2)	6882.28 ± 812.99***	34.75↓

Table 2b: Effect test drug (AYMC) on Total Carbohydrate-Total Protein Ratio

Group	Total Carbohydrate - Total Protein Ratio (µg/ml)	% change
Ulcer Control	0.035 ± 0.03	
Standard(Omeprazole	0.092 ± 0.009	162.85 ↑
TED (AYMC)	0.048 ± 0.004*	1061.22 ↑
TED 2 (AYMC 2)	0.16 ± 0.064	357.14 ↑

Table 2c: Effect test drug (AYMC) on d-Peptic activity

Group	d-Peptic activity (µmoles of Tyrosine released per ml)	% change
Ulcer Control	519.33 ± 74.86	
Standard(Omeprazole	638.33 ± 5.59	22.91 ↑
TED (AYMC)	686.33 ± 50.99	32.15 ↑
TED 2 (AYMC 2)	583 ± 46.60	12.26 ↑

HISTOPATHOLOGY

Microscopic examination of the stomach sections from the control group exhibited normal cytoarchitecture with regular and continuous epithelial layer, normal lamina proprial and muscualaris mucosa layers.The sections from pyloric ligation showed severely eroded epithelium and disoriented villi and crypts. Ulceration ranging from superficial to deep in depth was observed .In the reference standard (Omeprazole) administered group significant protection was observed. The epithelial erosion was very much reduced. The other layers of the stomach wall like lamina propria and muscularis mucosa appeared normal.

In therapeutic test drug & double therapeutic test drug administered groups, superficial ulceration with epithelial erosion was observed in some rats while normal cytoarchitecture was observed in others. The severity of ulceration was comparatively less in comparison to the pyloric control group.

CONCLUSION

The Aqueous Extract of Yastimadhu Churna[5] possess antiulcerogenic activity, when administerd in therapeutic dose (200mg/kg.body wt). When the dose was doubled (400mg/kg.body wt) its antiulcerogenic activity was found to decrease. Its gastroprotective effect may involve increase in prostaglandin secretion, which may promote mucous secretion and cell proliferation in the stomach. The test drug shows cytoprotective activity because it successfully prevented the formation of ulcers. As per the Rasa, Guna, Virya, Vipaka of the Yastimadhu and its wound healing properties described in ayurvedic texts it should have the property of reducing the gastric mucosal irritation and possess antiulcerogenic property.The attempts of identification of the constituents of Yastimadhu and their clinical utility have been done before in many previous studies, but that type of approach may not conclude anything. Therefore, present study was done without going into the analysis of constituents of the Yastimadhu, instead using it as whole in the form of aqueous extract. In this study it was concluded that the AYMC does not possess antioxidant properties. Therefore, observed ulcer healing may involve other mechanism of actions.

REFERENCES

1. Kd Tripathi, Essentials Of Medical Pharmacology, 7th Editon, Jaypee Brothers Medical Publishers (P) Ltd, Pp-968,Pg-653.
2. Talebi Bezmin Abadi, Amin. — Helicobacter Pylori: Emergence of A Superbug.| Frontiers In Medicine 1 (2014):34. PMC.Web.4 Mar.2016.
3. Raju.D, Ilango.K, Chitra.V,Ashiah.K , Evaluation of Anti-ulcer activity of methanolic extract of Terminalia chebula fruits in experimental rats. J.Pharm. Sci. & Res. 2009; 3:101-107
4. Michael Buenor Adinortey, Charles Ansah, Issac Galyuon, Alexander Nyarko, In Vivo Models Used For Evaluation Of Potential Antigastroduodenal Ulcer Agents.Volume 2013, Article ID 796405, 12 pages, 2013.doi:10.1155/2013/796405.
5. Sushruta, Sushruta Samhita, Kaviraj Ambikadutta Shashtri, Choukhamba Sanskrita Sansthan, 2015, Sutra Sthana, pg 27.