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(RESEARCH ARTICLE)

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Analysis of clinical characteristics of elderly patients with peptic ulcer

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Abstract

Introduction: Peptic ulcer is a growing concern in the elderly individuals due to the associated problems and lack of consistency in the clinical characteristics

Aim: The present study aims to assess the clinical characteristics of elderly individuals complaining for peptic ulcers

Methodology: This retrospective study was performed at the Hospital of Inner Mongolia University for Nationalities from November 2018 to November 2023. The records of the hospital were collected and patients were contacted. In total, 294 patients were included in the present study. The characteristics included in study were age, gender, weight, bedridden state, wheelchair support state, alcohol consumption, smoking, co-morbidities (diabetes, hypertension, coronary heart disease and hyperuricemia), history of the patients (gastrointestinal tract (GIT) bleeding, perforation, surgery and family history of gastric ulcer), gastric tests (gastrin 17, gastrin opalinase 1, gastrin opalinase 2), *H.pylori* infection, Complete blood count (CBC) test (RBC, WBC, HGB) and endoscopy, site (antrum, duodenal part of duodenum, duodenum, gastric body, gastric angle, gastric fundus, gastric cardia, gastric mucosa, multiple, pylorus, stomach angle and stomach fundus) and size of peptic ulcer, outcomes (hospital stay and complications).

The categorical variables were presented as frequencies with their percentages, whereas the continuous variables were depicted as mean and standard deviation (SD). For comparison, the patients were divided into two categories on the basis of their age, that is, group 1 with age range of below 65 years and group 2 with age range of above 65 years. For statistical analysis, student two-sample t-test was used to compare the continuous variables of two groups with p value of 0.05 marked as significant. On the other hand, the Chi square test was used for categorical variables

Results: Statistical significance was found between the two groups in terms of weight, bedridden state, wheelchair state, alcohol consumption, smoking, co-morbidities, history of GIT bleeding and surgery, gastrin 17, H.pylori infection, CBC test, endoscopy, sites, size, and complications.

Conclusion: It can be concluded that more complications are faced by the elderly patients due to peptic ulcers. Thus, additional management is required to deal with this age group.

Keywords: Peptic ulcer; Ulcer; Ulceration; H. pylori

1. Introduction

Peptic ulcers are the open sores or mucosal erosions that persist on the inner stomach lining and the upper portion of small intestine. It includes gastric ulcers and duodenal ulcers that may cause stomach pain, nausea, heartburn and belching (Bereda, 2022). Sometimes it may cause bleeding with symptoms of vomiting blood, dark blood stools and

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fainting. The cause of peptic ulcers is the acidity that consumes inner surface of stomach and small intestine, which cause painful sore that cause bleeding (Tuerk, Doss, & Polsley, 2023).

The peptic ulcers has become a great concern in the elderly population as aging is linked with different physiological changes that exposes older people to enhanced risk of ulcer formation, delayed healing and complications. There can be certain reasons of increased prevalence of peptic ulcers in old people, including H pylori infection and use of pain relievers. The H. pylori lives in mucous layer and can sometimes cause inflammation of stomach's inner layer leading towards ulcers (Shell, 2021). On the other hand, taking aspirin and NSAIDs can also impair mucosal defenses and cause inflammation of lining of stomach and small intestine. Factors such as gastric mucosal blood flow, impaired cellular repair mechanisms, decreased prostaglandin synthesis are the age related changes that further contribute to ulcer susceptibility. Apart from this, the prevalence of polypharmacy in elderly people enhances their proneness to ulcerogenic medications. Other risk factors for peptic ulcers include previous peptic ulcer. The factors that can make the peptic ulcer worse include smoking, drinking alcohol, having continuous stress and intake of spicy foods.

According to a recent estimation, peptic ulcers exist as one case per 1000 persons with years in general population and the incidence of ulcer complications was estimated to be 0.7 cases per 1000 persons (Vakil, Laine, & Swenson, 2025). The situation is critical for elderly individuals as the prevalence rates for people with age 70-74, 75-79, 80-84, and 85 years and older were 313.36, 365.77, 388.45, and 352.51 per 100 000 population, respectively (Zhuo, et al., 2025).

In elderly patients, the peptic ulcers are usually atypically presented as compared to younger population. Most of the old age people experience least or no epigastric pain, which results in late diagnosis. However, symptoms of weight loss, vomiting, nausea, anorexia and gastrointestinal bleeding are more eminent. More importantly, the silent ulcers that are prominent only at times of complications are more frequent in this age group. The non-specific nature of symptoms makes in time diagnosis of the disease difficult for elderly individuals.

Complications associated with peptic ulcers include stomach or duodenal bleeding, perforation in stomach wall, blockage and stomach cancer (Salari, et al., 2022). The management of peptic ulcers include combination of pharmacological and lifestyle interventions. Proton pump inhibitors (PPIs) and H2-receptor antagonists remain the most suitable treatment for decreasing gastric acid secretion. H. pylori eradication therapy is significant in terms of preventing the recurrence. NSAID-induced ulcers are dealt with discontinuation of NSAIDs with better alternatives. Moreover, misoprostol or PPIs are prescribed for gastroprotection in high-risk patients. Lifestyle modifications, including smoking cessation, alcohol reduction, and dietary adjustments, play a supportive role in ulcer prevention and healing.

Although many efforts have been paved to overcome the increasing prevalence of peptic ulcers. However, several challenges persist in elderly care. These challenges can be overcome only if the clinical characteristics of patients are better understood. The present work is an effort to undermine the clinical attributes of the patients with peptic ulcers and compare them for patients with age less than 65 and more than 65.

2. Methodology

This retrospective study was performed at the Hospital of Inner Mongolia University for Nationalities from November 2018 to November 2023. For this purpose, the records of the hospital were checked for the previous one year and the patients with the problem of peptic ulcers were included in the study. The patients were contacted with the help of given contact numbers. The patients with no contact number were not contacted and excluded from the study. The patients that were willing and available for the study were explained about the purpose of the study. They were made confirmed about the confidentiality and privacy of their personal information. The relevant tests and information were gathered from the selected patients.

In total, 294 patients were included in the present study. The demographics of the patients were collected including age and weight of the patients. However, some of the patients were bedridden or on wheelchair support. The risk factors of alcohol consumption, smoking, co-morbidities and history of the patients were noted. In co-morbidities, the patients were confirmed for diabetes, hypertension, coronary heart disease and hyperuricemia. On the other hand, the history of the patients included queries about gastrointestinal tract (GIT) bleeding, perforation, surgery and family history of gastric ulcer. A bleeding ulcer was regarded as melena, hematemesis with presence of blood in proximal duodenum or stomach, blood clot presence at ulcer artery.

Results for various diagnostic tests were collected including gastric tests, *H.pylori* infection, Complete blood count (CBC) test and endoscopy. Endoscopy was being performed with an Olympus GIF Q20 endoscope by a gastroenterologist.

Through endoscopy, the location and size of the ulcer were recorded at endoscopy. The gastric tests included gastrin 17, gastric opalinase 1 and gastrin opalinase 2 tests. In CBC test, the red blood cells (RBC), white blood cells (WBC) and hemoglobin (HGB) were assessed. In endoscopy, complain of gastric ulcers or multiple issues were dealt.

The characteristics of the peptic ulcers were noted in terms of site and size. The site of the peptic ulcers were marked as antrum, duodenal part of duodenum, duodenum, gastric body, gastric angle, gastric fundus, gastric cardia, gastric mucosa, multiple, pylorus, stomach angle and stomach fundus. Moreover, the outcomes of the peptic ulcers were noted as hospital stay and complications.

The categorical variables (gender, bedridden, wheelchair, alcohol consumption, smoking, co-morbidities of diabetes, hypertension, coronary heart disease and hyperuricemia, history of GIT bleeding, perforation, surgery and family history of gastric ulcer, gastric tests of gastrin 17, gastrin opalinase 1, gastrin opalinase 2, *H,.pylori* infection, endoscopy with gastric ulcers and multiple diagnosis, site of peptic ulcers of antrum, duodenal part of duodenum, duodenum, gastric body, gastric angle, gastric fundus, gastric cardia, gastric mucosa, pylorus, stomach angle, stomach fundus and multiple sites, and complications) were presented as frequencies with their percentages, whereas the continuous variables (weight, WBC, RBC, HGB, size of ulcer, hospital stay) were depicted as mean and standard deviation (SD).

For comparison, the patients were divided into two categories on the basis of their age, that is, group 1 with age range of below 65 years and group 2 with age range of above 65 years. For statistical analysis, student two-sample t-test was used to compare the continuous variables (weight, WBC, RBC, HGB, size of ulcer, hospital stay) of two groups with p value of 0.05 marked as significant. On the other hand, the Chi square test was used for categorical variables (gender, bedridden, wheelchair, alcohol consumption, smoking, co-morbidities of diabetes, hypertension, coronary heart disease and hyperuricemia, history of GIT bleeding, perforation, surgery and family history of gastric ulcer, gastric tests of gastrin 17, gastrin opalinase 1, gastrin opalinase 2, *H,.pylori* infection, endoscopy with gastric ulcers and multiple diagnosis, site of peptic ulcers of antrum, duodenal part of duodenum, duodenum, gastric body, gastric angle, gastric fundus, gastric cardia, gastric mucosa, pylorus, stomach angle, stomach fundus and multiple sites, and complications). However, Fisher exact test was used for smaller frequencies.

3. Results

The Table 1 shows basic demographic characteristics of the participants included in the study. The group 1 had 27 patients with age less than or equal to 65, whereas, group 2 had 267 patients with age more than 65. There were 9 (33.33%) females and 18 (66.66%) males in individuals with age less than 65, whereas, 102 (38.20%) females and 165 (61.79%) males were included in the patients with age more than 65. However, there was no statistical significance ($p = 0.47$; $p > 0.05$) between the two groups in terms of gender. The group 1 had mean weight of 64.22 ± 10.7 Kg and group 2 had mean weight of 64.68 ± 14.53 with $p = 0.889$ ($p > 0.05$). There were 0 bedridden individuals in group 1, whereas, there were 53 (19.85%) individuals that were bedridden in group 2. This difference was statistically significant with $p = 0.037$ ($p < 0.05$). On the other hand, there were 9 (33.33%) individuals on wheelchair support in group 1, whereas, there were 56 (20.97%) patients on wheel chair support in group 2. This factor was noted with statistical significance with $p = 0.0002$ ($p < 0.05$).

Table 1 Basic characteristics of the patients

Characteristics	**Below 65 (n = 27)**	**Above 65 (n = 267)**	**P value**
Gender n (%)			
Female	9 (33.33)	102 (38.20)	0.47
Male	18 (66.66)	165 (61.79)	
Weight (Kg) mean ± SD	64.22 ± 10.7	64.68 ± 14.53	0.889
Bedridden n (%)	0	53 (19.85)	0.037*
Wheelchair n (%)	9 (33.33)	56 (20.97)	0.0002*

The Table 2 shows risk factors associated with the disease. There were only 3 (11.11%) individuals with alcohol consumption in group 1, whereas, there were 31 (11.61%) patients in group 2. The two groups were significantly different with $p = 0.0013$ ($p < 0.05$). There were only 3 (11.11%) individuals with smoking in group 1, whereas, there were 38 (14.23%) patients in group 2. The two groups were significantly different with $p = 0.0004$ ($p < 0.05$).

In terms of co-morbidities, diabetes was present in 9 (33.33%) individuals of group 1, whereas, it was present in 240 (89.88%) patients of group 2. Statically significant difference was found between the two groups with $p < 0.001$. Hypertension was present in 24 (88.88%) individuals of group 1, whereas, it was present in 262 (98.12%) patients of group 2. Statically significant difference was found between the two groups with $p < 0.001$. Coronary heart disease was present in 0 individuals of group 1, whereas, it was present in 30 (11.23%) patients of group 2. Statically significant difference was found between the two groups with $p = 0.03$ ($p < 0.001$). No hyperuricemia was reported in both the groups.

Another risk factor of historical background was also collected. For GIT bleeding, there were 14 (51.85%) patients in group 1 and 114 (42.69%) patients in group 2 with its history. This factor was noted with statistical significance with $p < 0.001$. The history of perforation was evident for 8 (29.62%) patients in group 1 and 18 (6.74%) patients in group 2. No statistical significance was evident with $p = 0.249$ ($p > 0.05$). The family history of gastric ulcer was not present in any patient in both the groups. The history of surgery was observed for 7 (25.92%) patients in group 1, and 35 (13.10%) patients in group 2. This factor was noted with statistical significance with $p = 0.0013$ ($p < 0.05$).

Table 2 Risk factors associated with the disease

Characteristics	**Below 65 (n=27)**	**Above 65 (n=267)**	**P value**
Alcohol consumption n (%)			
Yes	3 (11.11)	31 (11.61)	0.0013*
No	24 (88.88)	236 (88.38)	
Smoking n (%)			
Yes	3 (11.11)	38 (14.23)	0.0004*
No	24 (88.88)	229 (85.76)	
Co-morbidities n (%)			
Diabetes	9 (33.33)	240 (89.88)	<0.001*
Hypertension	24 (88.88)	262 (98.12)	<0.001*
Coronary heart disease	0	30 (11.23)	0.0323*
Hyperuricemia	0	0	1
History n (%)			
GIT bleeding	14 (51.85)	114 (42.69)	<0.001
Perforation	8 (29.62)	18 (6.74)	0.249
Family history of gastric ulcer	0	0	1
Surgery	7 (25.92)	35 (13.10)	0.0013*

Table 3 shows diagnostic tests performed for confirmation of peptic ulcers. The gastrin 17 test was positive for 7 (25.92%) patients in group 1, whereas, it was positive for 95 (35.58%) patients in group 2. This difference was found to be statistically significant with $p < 0.001$. No positive results were found for gastrin opalinase 1 and gastrin opalinase 2 in both the groups. The mean for gastrin 17 was 16.09 ± 19.12 in group 1, whereas, it was 14.75 ± 19.67 for group 2. However, this difference was not significant statistically with p value of 0.736 ($p > 0.05$).

The H.pylori infection was found in 8 (29.62%) patients of group 1, whereas, it was positive for 102 (38.20%) patients of group 2. This difference was found to be statistically significant with $p < 0.001$. The mean value for H.pylori test in group 1 was 1.50 ± 3.44 and in group 2 it was 5.35 ± 9.15. This difference was statistically significant with p value 0.038 ($p < 0.05$),

The CBC test showed 13.65 ± 2.43 for WBC, 2.34 ± 1.23 for RBC and 84.3 ± 11.23 for HGB for patients of group 1. On the other hand, 8.38 ± 2.34 was found for WBC, 3.23 ± 1.24 for RBC and 112.22 ± 21.33 for HGB for patients of group 2. The values of WBC, RBC and HGB were found to be different with statistical significance with $p < 0.001$. The endoscopy

indicated gastric ulcers for 5 (8.51 %) patients of group 1, whereas, 4 (1.49 %) patients of group 2 showed gastric ulcers in endoscopy. This difference did not had statistical significance. On the other hand, multiple endoscopic findings were found for 22 (81.48 %) of the patients in group 1, whereas, 263 (98.50 %) patients showed multiple endoscopic findings in group 2. This difference had statistical significance with $p = 0.001$ ($p < 0.05$). Multiple endoscopic findings included chronic superficial gastritis with reflux, chronic superficial gastritis, atrophic gastric ulcer, gastric body and mucosa changes, esophageal varices, digestive tumor, gastric polyps, hiatal hernia, esophageal mucosal lesion, pyloric stenosis, ulceration of duodenal bulb of duodenum etc.

Table 3 Diagnostic tests performed

Characteristics	**Below 65 (n=27)**	**Above 65 (n=267)**	**P value**
Gastric tests n (%)	7 (25.92)	95 (35.58)	<0.001*
Gastrin 17	16.09 ± 19.12	14.75 ± 19.67	
Gastrin opalinase 1	0	0	1
Gastrin opalinase 2	0	0	1
H. pylori infection n (%)	1.50 ± 3.44	5.35 ± 9.15	0.038*
Yes	8 (29.62)	102 (38.20)	<0.001*
No	19 (70.37)	165 (61.79)	
CBC Test mean ± SD			
WBC	13.65 ± 2.43	8.38 ± 2.34	<0.001*
RBC	2.34 ± 1.23	3.23 ± 1.24	<0.001*
HGB	84.3 ± 11.23	112.22 ± 21.33	<0.001*
Endoscopy n (%)			
Gastric ulcers	5 (8.51)	4 (1.49)	0.882
Multiple	22 (81.48)	263 (98.50)	0.001*

The Table 4 shows characteristics relevant to the peptic ulcers including their sites and sizes. It is evident that 14 (51.85%) patients had peptic ulcer at antrum site in group 1, whereas, in group 2, 74 (27.71%) patients had peptic ulcer at this site. This difference was noted with statistically significant difference with $p < 0.001$. No patient in group 1 had peptic ulcer at duodenal part of duodenum, but 65 (24.34%) patients from group 2 had peptic ulcer in this region with statistical significance of $p = 0.01$ ($p < 0.05$). No patient in group 1 had peptic ulcer at duodenum, but 9 (3.37%) patients from group 2 had peptic ulcer in this region. However, this difference was not statistically significance of $p = 0.1$ ($p > 0.05$).

It is evident that 5 (8.51%) patients had peptic ulcer at gastric body in group 1, whereas, in group 2, 17 (6.36%) patients had peptic ulcer at this site. This difference was noted with statistically significant difference with $p = 0.03$ ($p < 0.05$). It is evident that 1 (3.7%) patients had peptic ulcer at gastric angle in group 1, whereas, in group 2, 9 (3.37%) patients had peptic ulcer at this site. This difference was noted with statistically significant difference with $p = 0.03$ ($p < 0.05$).

It is evident that 1 (3.7%) patients had peptic ulcer at gastric fundus in group 1, whereas, in group 2, 4 (1.49%) patients had peptic ulcer at this site. No statistical significance was noted with $p = 0.17$ ($p > 0.05$). It is evident that 0 patients had peptic ulcer at gastric cardia and gastric mucosa in group 1, whereas, in group 2, only 1 (0.37%) patients had peptic ulcer at this site. No statistical significance was noted with $p = 0.5$ ($p > 0.05$).

It is evident that 4 (14.81%) patients had peptic ulcer at multiple sites in group 1, whereas, in group 2, 78 (29.21%) patients had peptic ulcer at this site. This difference was noted with statistically significant difference with $p < 0.001$ ($p < 0.05$).

It is evident that 0 patients had peptic ulcer at pylorus in group 1, whereas, in group 2, only 2 (0.74%) patients had peptic ulcer at this site. No statistical significance was noted with $p = 0.33$ ($p > 0.05$). It is evident that 1 (3.7%) patients

had peptic ulcer at stomach angle in group 1, whereas, in group 2, only 2 (0.74%) patients had peptic ulcer at this site. No statistical significance was noted with p = 0.5 (p > 0.05). It is evident that 1 (3.7%) patients had peptic ulcer at stomach fundus in group 1, whereas, in group 2, only 5 (1.87%) patients had peptic ulcer at this site. No statistical significance was noted with p = 0.143 (p > 0.05).

It is observed that antrum is the most common site for peptic ulcers in groups 1 with 14 (51.85%) patients. However, multiple sites are common for group 2 with 78 (29.21%) patients. It is also observed that antrum was present in all the patients of group 1 having multiple sites for peptic ulcers. On the other hand, fundus, antrum and duodenal part of duodenum were common in pateints of group 2 having multiple sites of peptic ulcers.

The size of peptic ulcers in group 1 was 0.41 ± 0.13 cm to 0.44 ± 0.18 cm in comparison to 0.53 ± 0.23 cm to 0.58 ± 0.16 cm of group 2 patients. This difference was statistically significant with p = 0.01 (p < 0.05).

Table 4 Characteristics related to peptic ulcers

Characteristics	**Below 65 (n=27)**	**Above 65 (n=267)**	**P value**
Site n (%)			
Antrum	14 (51.85)	74 (27.71)	<0.001*
Duodenal part of duodenum	0	65 (24.34)	0.0152*
Duodenum	0	9 (3.37)	0.1
Gastric body	5 (8.51)	17 (6.36)	0.0327*
Gastric angle	1 (3.7)	9 (3.37)	0.0352*
Gastric fundus	1 (3.7)	4 (1.49)	0.1739
Gastric cardia	0	1 (0.37)	0.5
Gastric mucosa	0	1 (0.37)	0.5
Multiple	4 (14.81)	78 (29.21)	<0.001*
Pylorus	0	2 (0.74)	0.3333
Stomach angle	1 (3.7)	2 (0.74)	0.5
Stomach fundus	1 (3.7)	5 (1.87)	0.143
Size (cm) mean ± SD	0.41 ± 0.13 to 0.44 ± 0.18	0.53 ± 0.23 to 0.58 ± 0.16	0.0166*

Table 5 shows outcomes of the patients. The mean hospital stay for group 1 was 6.25 ± 10.7 days, whereas, it was 6.2 ± 4.4 days for group 2. The difference was not statistically significant with p = 0.982 (p > 0.05). The complications were noted for 26 (96.27%) patients in group 1, whereas, they were noted for 265 (99.25%) patients of group 2. This difference was statistically significant with p < 0.001 (p < 0.05). The complications included hypokalemia, urinary tract infection, renal stones, emphysema, chronic superficial gastritis, pleural thickening, chronic rectal and sigmoid colitis, ischemic bowel disease, cerebral thrombosis, anemia, hepatic cyst, echogenicity of liver parenchyma, chronic proctitis, anal polyps, multiple nodular foci, duodenal diverticulitis , multiple hepatic cysts, diffuse hepatic parenchyma, portal vein widening, cholelithiasis, liver parenchyma, spleen thickness etc.

Table 5 Outcomes of the patients

Characteristics	**Below 65 (n=27)**	**Above 65 (n=267)**	**P value**
Hospital stay (days) mean ± SD	6.25 ± 10.7	6.2 ± 4.4	0.982
Complications n (%)	26 (96.27)	265 (99.25)	<0.001*

The treatments utilized to deal with the peptic ulcers were multiple for all the patients. This included use of NaCl, dihydroquinine, famotidine, potassium citrate, metformin salt, gastric bismuth, lactate levofloxacine, insulin aspart, troprazo, tolazolna, opemrazole, amino acid, kcl, bismuth pectin, and ferrous fumarate.

4. Discussion

The present study is useful in terms of understanding the likely characteristics of elderly patients with peptic ulcers. It is important to understand these features in order to provide the elderly community with better treatment regime (Malfertheiner & Schulz, 2020).

The findings of the present study suggest that with age, the likelihood of peptic ulcers are increased as only 27 (9.18%) patients with age less than 65 had peptic ulcers, whereas, the patients with age more than 65 were 267 (90.81%). Moreover, it was observed that issues of being bedridden and on wheelchair support increased by age with statistical significance ($p < 0.05$).

The risk factors of alcohol consumption, smoking, co-morbidities (diabetes, hypertension, coronary heart diseases), history of GIT bleeding and surgery were also noted to increase by age with statistical significance ($p < 0.05$). The problem of perforation also increased with age but did not had statistical significance.

In terms of diagnostics, it was found that gastrin 17 test was more positive for individuals with age more than 65 with statistical significance ($p < 0.05$). Similarly, H.pylori infection, was more prominent in group 2 individuals with statistical difference ($p < 0.05$). The WBC, RBC and HGB were raised more for people with age more than 65 with statistical significance ($p < 0.05$). In endoscopy, multiple issues were eminent for group 2 individuals with statistical significance ($p < 0.05$).

The characteristics of peptic ulcers showed that size of peptic ulcers in group 2 individuals was more than group 1 with statistical significance ($p < 0.05$). Similarly, the locations of antrum, duodenal part of duodenum, gastric body, gastric angle, and multiple localities were eminent for group 2 with statistical significance ($p < 0.05$). The outcome of hospital stay was almost similar for both the groups but complications were more eminent in group 2 with statistical significance ($p < 0.05$).

The findings of present study are in accordance with the previous research works of Pakirdinov et al (2022) and Laucirica et al (2023), which claimed that the elderly age results in physiological changes leading towards more health problems. Similar is the case with the peptic ulcers. More attention is required to deal with the patients of this age

5. Conclusion

It can be concluded that more complications are faced by the elderly patients due to peptic ulcers. Thus, additional management is required to deal with this age group.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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