Original Research Article

A study of non traumatic acute abdomen in ESIC

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Abstract

Background of study: Non traumatic acute abdomen is wide spectrum of disease with similar presentation. Diagnosis is often difficult because clinical features may be masked and diagnostic radiology is constrained. Management may be stratified based on surgeons preference and patient's needs. **Objectives:** To study incidence, aetiology and pattern of clinical presentation of acute abdomen; To study the accuracy of clinical diagnosis. **Materials and methods:** A prospective study in a tertiary teaching hospital extended over 6 months (September 2019- February 2020). Patients presenting with acute abdomen and requiring more than 24 hours of observation, or care as inpatients in the surgical wards were included.History, clinical examination andProvisional diagnosis was noted in proforma. Basic investigations like total leukocyte count, urine microscopy, X-ray erect abdomen were done in all patients.Diagnosis was made based on clinical and investigation findings and further confirmed at laparotomy in operated patients.The institution ethics committee approved the study. The data was analysed by Winks statistical software, evaluation version. **Results:** 605 eligible patients were picked up to participate in the study. 495 patients with surgical causes of acute abdomen were included for prospective study and analysis. 314 (63.4%) were managed operatively.Accuracy of clinical diagnosis based on history and physical examination supported by specific investigations was 87.27%. **Conclusion:** Patient presenting with acute abdominal pain has no anorexia, raised temperature, guarding, or rebound tenderness, leukocytosis and urinary abnormalities at presentation then he is less likely to need any surgical intervention irrespective of age, sex, pain duration and presence or absence of vomiting, bowel abnormalities or tenderness.

Key words: Acute abdomen, diagnosis, Surgery.

Introduction

Acute abdominal pain can represent a spectrum of conditions from benign and self-limited disease to surgical emergencies [1]. Evaluating abdominal pain requires an approach that relies on the likelihood of disease, patient history, physical examination, laboratory tests, and imaging studies. The characterization of pain is a useful starting point and will guide further evaluation.In the acute surgical abdomen, pain generally precedes vomiting, while the reverse is true in medical conditions. Diarrhea often is associated with gastroenteritis or food poisoning [2]. Repeated physical examination by the same physician is mostly useful, especially more when diagnosis unclear after initial evaluation [3].

Art and science of Ultrasonography should be mastered and used by surgeons and must be a part of routine surgical investigation [4,5]. Performing computed tomography (CT) abdomen facilitates an accurate and reproducible diagnosis in urgent conditions and has been trend in recent times [6]. The authors have made an attempt to utilize the bed side resources so as to quantify lacunae's and train the graduates in picking up the clinical skills.

Aim of the study

1. To study the incidence, etiology and pattern of clinical presentation of acute abdomen
2. To study the accuracy of clinical diagnosis with reference to post-operative diagnosis

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Methodology

It was a Prospective analytical study carried out in the Department of Surgery, ESIC MC & PGIMSR, Bengaluru between September 2019 to Feb 2020. Study population being the patients attending ESIC Hospital with acute abdominal pain and requiring admission under the Department Surgery.Patients presenting with acute abdominal pain and requiring more than 24 hours of observation, or care as inpatients in the surgical wards were included. Patients with traumatic acute abdomen; Patients with medical, urological and gynecological etiology mimicking acute abdomen;Patients not requiring admission or who died before admission;Patients who refused to participate in the study were excluded.

Simple random sampling (SRS) based on number of hospital admissions for acute abdomen in the previous years was used to calculate sample size. Patients were informed regarding the aims and objects of the study and a detailed informed written consent was taken from the guardian (in case of minor less than 18 years consent from the parent was taken and assent from the patient were taken).The data was recorded prospectively in a pre-designed proforma. Approval from the institutes` ethical committee was taken prior to study.

Procedure

- History taking and clinical examination was done.
- Provisional diagnosis was made.
- Basic investigations like total leukocyte count, urine microscopy for pus cells and RBCs, X-ray erect abdomen were done in all patients.
- Ultrasound screening of the abdomen was done in patients with no signs of perforation peritonitis.

- Other investigations e.g., C T scan abdomen, upper GI endoscopy, X-ray Barium studies, Colonoscopy etc were performed if required.
- Histopathological examination was done wherever necessary.
- Diagnosis was made based on clinical and investigation findings and further confirmed at laparotomy in operated patients.
- The mode of management either surgical or non–operative was noted

Statistical analysis

- ✓ Statistical analysis was done with Winks statistical software, evaluation version.
- ✓ Parametric and non-parametric tests were used wherever necessary.
- ✓ Associations, correlations were tested using standard tests.
- ✓ Multinomial logistic regression was used to predict the independent factors associated with the need for surgery.
- ✓ P <0.05 was considered to be significant

Results

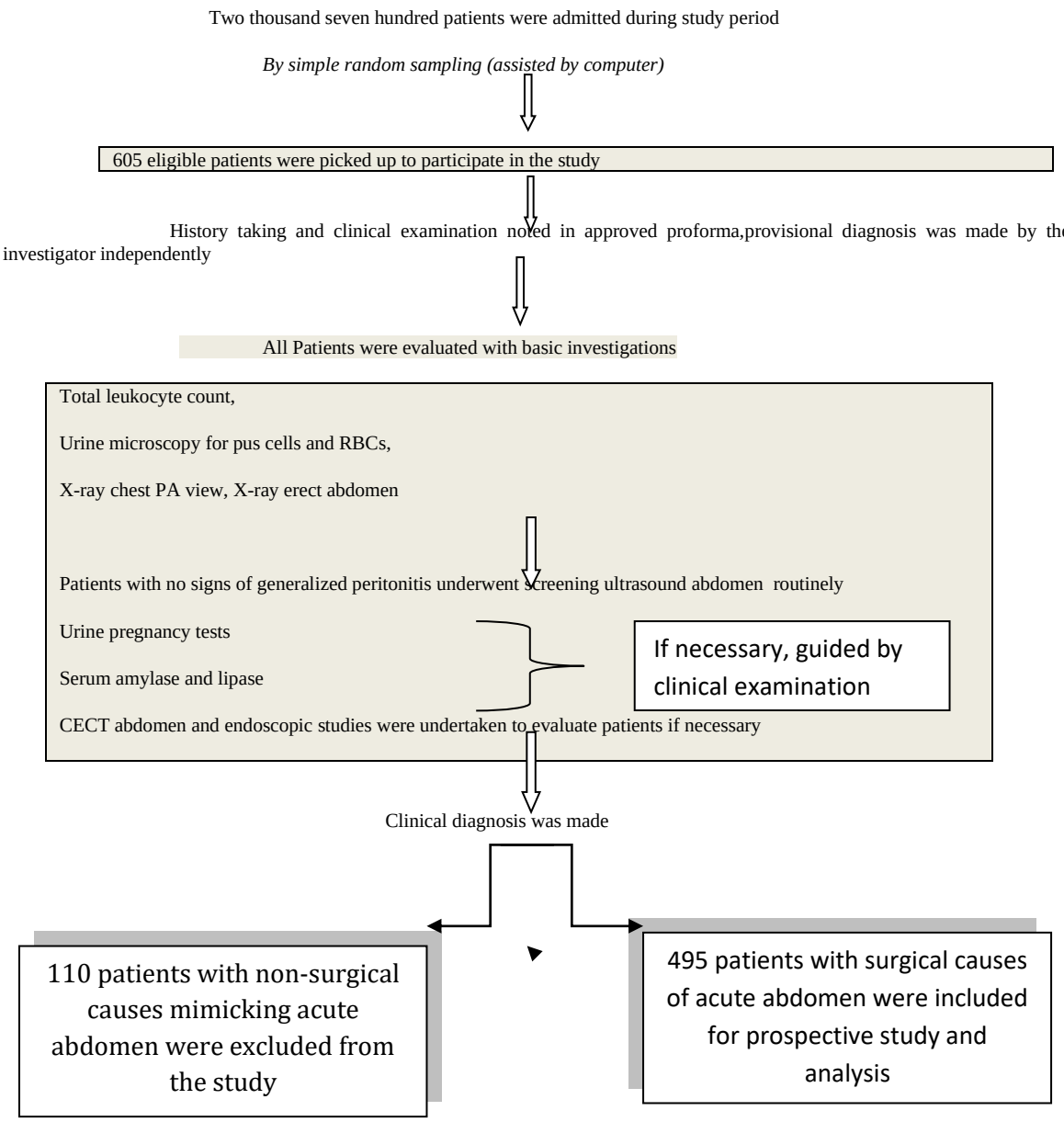

Fig1: Flow chart depicting the research methodology of this study

Patients in the age group of less than 50 years were nearly eighty percent (394) patients. The predominance of the younger population was statistically significant (P<0.001).Males comprised 53.5% of the study sample and females were 46.5%. Though apparently males were higher in number, there was no statistically significant distribution of either sex (P=0.116).Around 76% of acute abdomen

patients presented within 48 hours and 97% of them presented within 5 days, the difference in presentation was statistically significant (p< 0.001).Anorexia was present in 51.5% of patients, the presence or absence of anorexia in patients presenting with acute abdomen was not statistically significant (p=0.5).Twenty two percent of the patients had no nausea or vomiting whereas 47% had one or more episodes of nausea or vomiting which was statistically significant (p<0.001).Normal bowel motions were observed in 57.6% patients whereas diarrhoea or constipation was present in the rest which was statistically significant (p<0.001).Around one third of the patients presenting with acute abdomen were not febrile at presentation with others being febrile, the difference was statistically significant (p<0.001).Only 43.7% of patients had a pulse rate of more than 90/min compared to the rest which was statistically significant (p<0.001). Only 6% of the patients in our study presented with shock which was statistically significant (p<0.001).Around 17% of the patients presented with tachypnea of >30/min which was statistically significant (p<0.001).

Mild dehydration was present in 41.6% of patients and nearly 35% presented with severe dehydration which was statistically significant (p<0.001).Generalised tenderness was present in 29.3% of patients and 30.1% of patients had pain restricted to a single region which was statistically significant (p<0.001).Rebound tenderness was present in only 16.8% of patients which was statistically significant (p<0.001).Liver dullness was obliterated only in 15.3% of the patients of which in 6 patients no perforation was evident. The difference was statistically significant (p<0.001).Localised guarding was present in 26.7%% of patients. It was generalised in 17.8% patients. This difference in incidence was statistically significant (p<0.001).

Table 1: Diagnosis after clinical Examination

Etiology	Frequency	Percentage
Perforation peritonitis	127	25.7%
Acute appendicitis	108	21.8%
Acute cholecystitis	88	17.8%
Acute intestinal obstruction	50	10.1%
Acute pancreatitis	41	8.3%
Acute gastritis	30	6.1%
Colitis	15	3.0%
Urinary Tract Infection	10	2.0%
Mesenteric lymphadenitis	10	2.0%
Typhoid ileitis	5	1.0%
Renal calculi	5	1.0%
Cystitis	5	1.0%
Ureteric colic	1	0.2%
Total	495	100%

Leukocytosis was present in 22.4% of the patients with its absence in the rest was statistically significant (p<0.001).Urinary abnormalities were noted in 32.9% and normal in the rest. The difference in the urinary abnormalities was statistically significant (p<0.001).X-ray erect abdomen findings was not specific in 70%, Free gas under diaphragm was seen in 17% of study population, 10% of study population had renal calculi, 5% showed more than 3 air-fluid levels and Ground glass appearance seen only in 4%.Ultrasound abdomen was diagnostic in 47.9% of the patients.Among the 495 patients with acute abdomen 314 (63.4%) were managed operatively and 181 (46.57%) non-operatively. The greater patients presenting with acute abdomen undergoing operative management was statistically significant (p<0.001).

Table 2: Final diagnosis

Etiology	Frequency	Percentage
Acute appendicitis	138	27.9%
Perforation Peritonitis	110	22.2%
Acute cholecystitis	90	18.2%
Acute intestinal obstruction	40	8.1%
Acute pancreatitis	40	8.1%
Acute gastritis	20	4.0%
Non specific abdominal pain	16	3.2%
Mesenteric lymphadenitis	15	3.0%
Colitis	15	3.0%
Psoas abscess	5	1.0%
Tumours	5	1.0%
Spontaneous adrenal hematoma	1	0.2%
Total	495	100.0%

Perforation peritonitis was etiology in 110 patients with frequency being Peptic Duodenal perforation in 50.0%, Typhoid ileal perforation in 23.7%, Appendicular perforation in13.6%, Non-specific ileal perforation in 9.1% Tubercular ileal perforation in 3.6%.Intestinal obstruction was etiology in 40 patients with frequency being Adhesive small bowel obstruction in 55%, large bowel obstruction in 20%, Sigmoid volvulus in7.5%, Obstructed inguinal hernia, Intussusception in5%, other obstructive hernia in 7.5%.The mean number of hospital days were 8.84(SD of 4.582 days), ranging from 2 to 28 days. The mean number of days was

8.81(SD 4.765) and 8.9 (SD 3.801) respectively in less than 5o year and more than 50-year age group which was not statistically significant (p=0.750). No significant difference in either sex was noted (p=0.274). There was statistically significant difference (p<0.001) between non-operative and operative group with mean of 6.79 (SD 3.79) and 10.17 (SD 4.640) days.

Table 3: Logistic regression analysis showing independent predictive factors for operative management (P <0.05 is significant)

Predictive factors of operative group	P-Values
Age	0.232
Sex	0.398
Pain duration at presentation	0.852
Anorexia	0.004*
Vomiting	0.950
Bowel motions	0.613
Pyrexia	0.004*
Pulse rate of more than 90 per minute	0.393
Systolic blood pressure of less than 90mm Hg	<0.001*
Respiratory rate of more than 30 per minute	0.647
Dehydration	0.014*
Tenderness	0.405
Rebound tenderness	<0.001*
Guarding or rigidity	<0.001*
Obliteration of liver dullness	0.003*
Leukocytosis	0.009*
Abnormal urinalysis	0.028*

Table 4: Accuracy of clinical diagnosis by aetiology

Etiology		Clinical diagnosis	
		correct	wrong
Acute appendicitis	No. of patients	109	29
	Percentage	79%	21%
Acute cholecystitis	No. of patients	85	5
	Percentage	94.4%	5.6%
Perforation Peritonitis	No. of patients	100	10
	Percentage	90.9%	9.1%
Acute intestinal obstruction	No. of patients	40	0
	Percentage	100%	.0%
Acute pancreatitis	No. of patients	40	0
	Percentage	100%	.0%
Psoas abscess	No. of patients	5	0
	Percentage	100%	.0%
Mesenteric lymphadenitis	No. of patients	15	0
	Percentage	100%	.0%
Others	No. of patients	38	19
	Percentage	66.66	33.34
No. of patients		432	63
Percentage		87.3%	12.7%

The difference in the diagnostic accuracy is statistically significant (P<0.001).

Discussion

The most common cause of acute abdominal pain is non-specific abdominal pain(24 - 44.3 % of the study populations), followed by acute appendicitis(15.9 - 28.1%),acute biliary disease(2.9-9.7%) and bowel obstruction or diverticulitits in elderly patients[Grundmann]. Ninety-three patients of 314 were discharged with a final diagnosis of "non-specific abdominal pain" (NSAP) after their symptoms had improved[5]. In our study we were able to label a final diagnosis in most and nonspecific abdominal pain constitutes only 3.2% of Study population.

Table 5: Comparison of time of presentation from onset with different studies

Study	<12 hours	12-23hours	24-48 hours	48 hours or more
J.R Staniland et al British (1972)[7]	32.33%	23.33%	24.16%	36.83%
JD Wig et al, PGIMER, Chandigarh (1978)[8]	19%	17%	7%	45%
Ohene-Yeboah, Ghana West Africa(2006)[9]	-	-	-	47.5% of patients who died
Present study, ESIC (2019-20)	9.9%	25.6%	33.1%	30.5%

The delay in seeking early medical care is attributed by the Staniland et al to the attitude of majority of patients giving a trial of observation at home, ignorance among people at our place are also additional factors [7]. There is correlation between duration of pain at presentation with final diagnosis (p=0.045) but not with mode of management (p= 0.65). A similar observation was made by Laurell where there was no difference in duration of abdominal pain before admission between patients being operated upon and those not [10].

Anorexia was present only in 48.5% of patients presenting with acute abdomen which is in close conformity to Wig JD et alof 45% [8]. Though neglected as one of the weakest factorin many studies, we observed a statistically significant association with the diagnosis of acute abdomen [(Pearson's Chi-square p< 0.001, Pearson's R, Spearman correlation p<0.001)]. There is also correlation between anorexia and operative, non-operative and referral groups [Pearson's Chi-square (p=0.019), Pearson's R=0.011 and Spearman correlation = 0.07]. Logistic regression analysis showed that anorexia is an independent predictor of acute appendicitis (p=0.011), acute cholecystitis (p=0.027), and perforation peritonitis (p=0.018). It was not significant with acute abdomen of other etiology. Laurell et alsimilarly found it to be significant in appendicitis group (p<0.001) [10]. Anorexia was also a significant independent predictor for the need of surgery in our patients of acute abdomen (p< 0.001).Nausea or vomiting was present in 78.2% of patients in contrast to 90% of patients having vomiting in study by JD wig et al[8]. Nearly thirty two percent patients had only nausea, with severe vomiting seen in cases of acute pancreatitis. Vomiting was observed by Raghavendra et alin 91.67% of operated cases of acute abdomen [11]. It was also more common with acute appendicitis in study by Helena Laurell , but no statistically significant association existed between presence of vomiting and any of diagnoses [10]. Fever suggests an association of inflammatory process with acute abdomen. Thirty one percent of patients had mild fever. Moderate and high-grade fever was seen in 23.1% and 13.2% patients respectively. A similar observation was made by Raghavendra et al with 60% of their patients operated of acute abdomen had fever [11]. Presence of fever at presentation was a significant predictor of the need for surgery (p<0.001) in our study.

A significant proportion of patients with perforated duodenal ulcer, cholecystitis and pancreatitis had a significant past history in our study.Only 23.2% of patients were adequately hydrated and 6.1% of all patients presented with shock. 14% of patients had respiratory rate of > 30/minute. Jhobta RS et al reported tachypnea in more than 66% of their perforation peritonitis patients [12]. Nearly 9% of their patients presented with shock in contrast to shock in 18% of perforation cases in our study. The presence of shock was significantly associated with perforation peritonitis in our study (P <0.05). The initial differential diagnosis can be determined by a delineation of pain location, radiation and movement. However only 38% of patients had pain localised to specific siteas observed by Staniland et al[7]. Our patients had site specificity of 28.9%, which called in the knowledge of other signs to arrive at a diagnosis. In 31.4% of patients, tenderness was elicited in two adjacent regions. Generalised tenderness was present in 24.8% patients, followed by tenderness in three or more adjacent regions (13.3%). This accounts for inaccuracy of diagnosis based on the topographic findings of the abdomen. However, no tenderness was observed in 1.7% of patients in this study. In the study by Staniland et al on acute abdomen no tenderness was present 4% of the patients [7]. The intermittent nature of pain in some conditions may explain this finding.Liver dullness was obliterated in 68.1% of patients of perforation peritonitis as against 43% in study by Raghavendra et alin patients needing surgery for acute abdomen [11]. We encountered false positive obliteration of liver dullness in six of COPD (1.2%) patients but were reassured by X-rays not impacting the management.Though helpful in bowel obstruction and lower abdominal pain, Moll van Charante EP et al have concluded that digital rectal examination (*DRE)* does not have added diagnostic value for appendicitis, peritonitis or small bowel obstruction [13]. Our findings were similar to theirs with normal digital rectal examination in majority. Being a nonspecific test, it had no added diagnostic utility. Comparison of digital rectal examination in our study was similar to Staniland et al[7].Basic diagnostic work-up (history, physical examination, blood tests, sonography and abdominal X-ray) revealed the final diagnosis in 188 patients of 314 patients [5]. In our study group X ray abdomen had nonspecific findings in more than 70% of the patients.US improved the correct diagnostic rate from 348 (70%) to 414 (83%). The diagnostic accuracy for acute appendicitis and biliary tract disease improved after US from 455 (92%) to 488 (98%) and from 463 (93%) to 490 (99%), respectively; the corresponding sensitivities and specificities were 91% and 99% and 94% and 99% [4]. In our series ultrasound abdomen was diagnostic in 47.9% of the patients.The initial diagnosis agrees in 57% with the final diagnosis [14]. Our study had an diagnostic accuracy of 87.3% in study population. The most common diagnosis on admission was appendicitis. Only half of the patients with appendicitis on admission really proved to be an appendicitis[14]. Diagnostic accuracy of Appendicitis by clinical examination was 79%. The impact of analgesics on diagnostic accuracy depends on dosage, kind of application and cause of acute abdominal pain[15]. Analgesic usage was not taken into consideration for analysis in our study group as most were referred from general practioners.Our study acknowledges the facts by F.T de Dombal et al [16], Muhammad A et al[17] and Laal et al[18]that the typical findings seem to occur in only about 60-70% of patients which help in correct diagnosis, 30-40% of cases may be misdiagnosed at presentation following these observations regarding the natural history/pa. Accuracy of clinical diagnosis based on history and physical examination supported by specific investigations was 87.27% in our study. Our diagnostic accuracy is comparable to that of (87%) Wig JD et al[8], (90.5%) Muhammad A et al[17], (69.8%)Marjan laal et al[18].The accuracy of diagnosing acute appendicitis was 88% in the study by laal et al[18]. In contrast, the accuracy in diagnosing rest of the diagnoses at emergency was only 66%. The difference in the diagnostic accuracy between different conditions was statistically significant (P<0.001). This highlights that the uncommon things should be kept in differential diagnoses whenever relevant. Further, the varying pattern of acute appendicitis which is the commonest should be kept in mind to avoid misdiagnosis.Multinomial logistic regression analysis was performed to find the factors which are independent predictors of the need for surgery in the patients presenting with acute abdomen. Anorexia, pyrexia, shock, dehydration, rebound tenderness, guarding, rigidity, obliteration of liver dullness on clinical examination at presentation, leukocytosis and urinary abnormalities when present were the significant factors predicting the need for surgery at (P <0.05).A similar study by Abbas et al [19] showed that the significant predicting factors for acute surgical diagnosis are heart rate (p = 0.048), guarding (p = 0.0009), elevated WBC (p = 0.016) and vomiting (p =0.008). Age, sex, pain duration, altered bowel habits, urinary symptoms, tenderness, rigors were not significant predictors of surgical diagnosis; however, their study included nonsurgical causes mimicking acute abdomen thus making the comparison incompatible.CT can therefore be considered the primary technique for the diagnosis of acute abdominal pain, except in patients clinically suspected of having acute cholecystitis [6]. Our series, CT was utilized only in select patients of intestinal obstruction.

Strength of the study

1. It was a prospective study.
2. No observer bias exist as all the history taking, examination and documentation were done by a single principal investigator using a standard proforma.

Limitations of the study

1. The Admission criteria for all the decisions of admission were not defined; it was dependent on the clinical judgments of the

concerned Surgical Registrars with no standard hospital protocol. Hence there may still be a selection bias.
2. Being a tertiary care centre many of the patients were treated earlier by primary care physicians with analgesics and other drugs symptomatically before referring, which may have altered the pattern of disease at presentation impacting the outcome of the study
3. Being restricted by time, work and academic constraints of the principal investigator not all patients admitted in the whole of study period were included. However, efforts were made to nullify this effect by random sampling assisted by computer and thus giving an equal chance for every patient to be sampled.

Conclusion

By this prospective analysis we conclude that if a patient presenting with acute abdominal pain has no anorexia, raised temperature, guarding,or rebound tenderness,leukocytosis and urinary abnormalities at presentation then he is less likely to need any surgical intervention irrespective of age, sex, pain duration and presence or absence of vomiting, bowel abnormalities or tenderness. Acute appendicitis continues to be most common etiology in our geographical region. Early presentation is of prognostic significance. Diagnostic accuracy can be further increased by standardizing proforma and tested in different population.

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