



## Original Article

## Risk Factors of Intestinal Perforation Associated with Peritonitis

 Imran Younas<sup>1</sup>, Alia Naseer<sup>1\*</sup>, Usra Naeem<sup>1</sup>, Muzamil Irshad<sup>1</sup>, Muhammad Umair<sup>1</sup>, Fazeelat Akram<sup>1</sup>, Maria Fayyaz<sup>1</sup> and Manzoor Ahmad Naeem<sup>2</sup>
<sup>1</sup>Department of Health Professional Technologies, Faculty of Allied Health Sciences, The University of Lahore, Pakistan

<sup>2</sup>Al Baha Hospital, Kingdom of Saudi Arabia

## ARTICLE INFO

## Key Words:

Intestinal perforation, Appendicitis, Fever

## How to Cite:

 Younas, I., Naseer, A., Naeem, U., Irshad, M., Umair, M., Akram, F., Fayyaz, M., & Naeem, M. A. (2023). The Risk Factors of Intestinal Perforation Associated with Peritonitis: Risk Factors of Intestinal Perforation. *Pakistan Journal of Health Sciences*, 4(02). <https://doi.org/10.54393/pjhs.v4i02.574>

## \*Corresponding Author:

 Alia Naseer  
 Department of Health Professional Technologies,  
 Faculty of Allied Health Sciences, The University of  
 Lahore, Pakistan  
[annanaseer@gmail.com](mailto:annanaseer@gmail.com)
Received Date: 10<sup>th</sup> February, 2023Acceptance Date: 26<sup>th</sup> February, 2023Published Date: 28<sup>th</sup> February, 2023

## ABSTRACT

Perforation is known as an abnormal opening in an empty organ. It is copied from the Latin word perforatus, meaning "to bore through." In western world the estimated frequency of intestinal perforation ranges from 0.6% to 4.9%. **Objective:** To find out the risk factors of intestinal perforation associated with peritonitis. **Methods:** It was a cross-sectional study and data was collected from February 2022 to July 2022. Data was collected from, DHQ Teaching Hospital Gujranwala and Social Security Hospital Multan chungi Lahore. Calculated sample size was 50 based on prevalence (0.68%) of intestinal perforation through an online sample size calculator (CI 95% and margin of error=0.09%). Patients of both genders with age limit of 10-60 years and patients presenting with perforation peritonitis were included in this study. Patients with Post-operative peritonitis and Immuno-compromised patients were excluded from study. Patient demographic information was collected. For demographic variables and risk factors of intestinal perforation descriptive analysis was used. Ethical approval has been obtained from concerned department and statistical analysis was done using SPSS version 24. **Results:** Out of 50 patients 38% were female and 62% were male. Major risk factors for intestinal perforation were Appendicitis (32%), Trauma (26%), Abdominal distension (24%) and Intestinal obstruction (20%). **Conclusion:** This study concludes that intestinal perforation is commonly seen between the age group of 21-30 years. Common risk factors of intestinal perforation are fever, appendicitis, trauma, abdominal distension, followed by intestinal obstruction, ascites and infection. The most commonly found perforation is duodenal perforation.

## INTRODUCTION

Perforation is described as an abnormal opening in an empty organ. It is derived from the Latin word *perforatus*, meaning "to bore through" [1]. Perforation is stated to happen when there is a pathology that affects the entire hollow organ down to the peritoneal blemish with intraluminal packing. The gastrointestinal system can get perforated anywhere, initially from the esophagus to the rectum. Perforation peritonitis can cause bacteremia, generalized sepsis, multiorgan failure and shock if not treated [2]. Typhoid caused by Salmonella Typhi is still a devastating systemic illness in developing nations that also cause intestinal perforation [3]. The presence of various microorganisms in intestinal perforation peritonitis varies

with geographic location, patient characteristics and the site of perforation [4]. The condition known as pancreatitis is an inflammatory process brought on by bacterial, fungal, and viral infections as well as various irritants, papilloma and drugs. It results in open colonic or intestinal perforations, which are the most frequent condition leading to a surgical emergency [5]. Lower intestine perforation (LIP) is a rare but serious condition that typically needs emergency surgery due to its high fatality rate. The lower gastrointestinal tract was found to be where gastrointestinal perforations in people with rheumatoid arthritis (RA) most frequently occurred [6]. Colonic perforative peritonitis (CPP) is one of the severe

and challenging surgical emergencies due to range of clinical manifestations, complicated diagnosis and high lethality. a variety of etiopathogenetic factors can origin of perforation of the colon - inflammatory, oncological, vascular, obstruction, foreign bodies, iatrogenic interventions and others [7-9]. The gallbladder, extrahepatic biliary tree, urinary bladder, stomach, duodenum, jejunum, ileum, appendix, caecum, ascending, transverse and large intestines are some of the organs in the abdomen that can be perforated [10]. Disease with H.pylori, non-steroidal anti-inflammatory drugs (NSAIDs), chronic alcohol use, cigarette smoking, consumption of smoked foods, spicy foods and an imbalanced diet are the main risk factors [11]. Hippocrates first reported the Hippocratic facies, which is still seen as a critical predictive factor today, when first identified the condition of peritonitis [12]. For prevention of morbidity and mortality of peritonitis due to spillage of intestinal contents early identification and correct treatment is necessary. For diagnosis of intestinal perforation, ultrasound is the primary test and secondary testing such as CT, MRI and X-ray are reasonable options if required [13]. One of the common surgical emergencies that bears a greater death rate is secondary bacterial peritonitis caused by empty viscous perforation. In order to predict the outcome of patients with perforation peritonitis, several scoring systems are used. One of many is the Mannheim Peritonitis Index (MPI). MPI is an easy grading system for mortality in patients with peritonitis[14]. Surgery is not required in all cases of intestinal perforation but in both conditions operative and non-operative patient's early treatment includes bowel rest, intravenous fluids, intravenous broad-spectrum antibiotics, and frequent abdominal examination. Surgery is required for patients with perforative peritonitis and for those who have persistent symptoms after conservative treatment. No matter the underlying an etiology, laparotomy has historically been the preferred method of treatment for perforative peritonitis. However, because to several diagnostic and therapeutic benefits, laparoscopy for abdominal emergencies has recently gained widespread recognition. Resection of perforated site is undertaken [15]. We worked our best to find out the risk factors of intestinal perforation with peritonitis, so that we can diagnose it early for administering early treatment. By knowing the risk factors, rate of mortality and morbidity can be reduced. On the best of my knowledge and literature, we have found the international research but less literature was found at National level.

## METHODS

This was cross-sectional study and data was collected from February 2022 to July 2022. Data were collected

through Questionnaire comprising of questions related to risk factor of intestinal perforation associated with peritonitis. Risk factors for intestinal perforation such as, Intestinal obstruction, Abdominal distention, Gastric ulcer, Duodenal ulcer, Infection, Inflammation, Fever, Trauma, Appendicitis and Perforation were noted. Calculated sample size was 50 based on prevalence (0.68%) of intestinal perforation through an online sample size calculator (CI 95% and margin of error=0.09%). Data was collected from, DHQ Teaching Hospital Gujranwala and Social Security Hospital Multan chungi Lahore. Patients of both genders with age limit of 10-60 years and patients presenting with perforation peritonitis were included in this study. Patients with post-operative peritonitis and Immunocompromised patients were excluded from study. Participant consent was also taken and they were informed by the objective of the study. Patient demographic information was collected. Descriptive analysis was used for demographic variables and risk factors of intestinal perforation. Ethical approval has been obtained from concerned department and patients' statistical analysis was done using SPSS version 24.0. Descriptive analysis was carried out. All the quantitative variables were presented with Mean+SD and qualitative with frequency and percentages.

## RESULTS

Table 1 shows that 12(24%) patients belongs to 10-20 years of age category, 14 (28%) patients belongs to 21-30 of age category, 13 (26%) patients belongs to 31-40 year of age category , 3 (6%) patients belongs to 41-50 years of age category and 8(16%) patients belongs to 51-60 years of age category in total population.

Age	Frequency (%)
10-20	12 (24.0%)
21-30	14 (28.0%)
31-40	13 (26.0%)
41-50	3 (6.0%)
51-60	8 (16.0%)
Total	50 (100.0%)
Gender of Patient's	
Female	19 (38.0%)
Male	31 (62.0%)
Total	50 (100.0%)

**Table 1:** Demographic Table of Population

In table 2, we found that Out of 50 patients, 10 patients had Intestinal Obstruction, 12 patients had Abdominal distention, 4 patients had Gastric Ulcer and 3 patients had Duodenal Ulcer, 9 patients had Ascites, 4 patients had Infection, 19 patients had fever, 16 patients had Appendicitis, 13 patients had Trauma, 11 patients had Inflammation in which 34 patients had Duodenal

perforation, 11 patients had Colon perforation, 7 patients had Stomach, 7 patients had Jejunum, 7 patients had Ilium and 2 patients had Rectum perforation.

Variables	Sub Variables	Frequency (%)
Intestinal obstruction	Yes	10 (20%)
	No	40 (80%)
Abdominal distension	Yes	12 (24%)
	No	38 (76%)
Gastric Ulcer	Yes	4 (8%)
	No	46 (92%)
Duodenal Ulcer	Yes	3 (6%)
	No	47 (94%)
Ascites	Yes	9 (18%)
	No	41 (82%)
Infection	Yes	4 (8%)
	No	46 (92%)
Trauma	Yes	13 (26%)
	No	37 (74%)
Appendicitis	Yes	16 (32%)
	No	34 (68%)
Fever	Yes	19 (38%)
	No	31 (62%)
Inflammation	Yes	11 (22%)
	No	39 (78%)
Stomach Perforation	Yes	7 (14%)
	No	43 (86%)
Duodenal Perforation	Yes	34 (68%)
	No	16 (32%)
Jejunum Perforation	Yes	7 (14%)
	No	43 (86%)
Ileum Perforation	Yes	7 (14%)
	No	43 (86%)
Rectum Perforation	Yes	2 (4%)
	No	48 (96%)
Colon Perforation	Yes	11 (22%)
	No	39 (78%)

**Table 2:** Descriptive statistics of risk Factors of intestinal perforation

## DISCUSSION

In current study we found that out of 50 patients, 38% patients had fever, 32% patients had appendicitis, 26% patients had trauma and Infection in 8% patients. Similar study was conducted by Bali et al in 2014. They showed that appendicitis was 18.5%, infectious 12%, tuberculosis 10%, and trauma 9% [16]. A study was published in 2010 by Gupta et al. They collected data of 400 patients to find the risk factors of perforation peritonitis. The results showed that Duodenal ulcer was in 176(44%), Appendicitis was in 96(24%), Typhoid was in 56(14%), Trauma was in 28(6%), Gastric ulcer was in 12(3%), Obstruction in 16(4%) and 8(2%) had malignancies [17]. According to the current research the results shows that Duodenal ulcer was in 3(6%) patients, Appendicitis in 16(32%) patients and Trauma in

13(26%) patients, infection in 4(8%) patients and gastric ulcer in 4(8%). Another study conducted by Jhobta RS et al. published in 2014. They found that commonest cause of perforation was duodenal ulcer 289, appendicitis was 59, trauma 45, and 41 had typhoid fever [18]. Current study shows that out of 50 patients, 16 patients had appendicitis, 13 had trauma, 19 patients had fever, 11 had inflammation, 12 had abdominal distension and 4 patients had gastric ulcer, 3 had duodenal ulcer. Gupta and Kaushik conducted a study on peritonitis. They found that duodenal perforation was most commonly seen. Less commonly seen perforations were small bowel and appendicular perforation. Colonic perforation was not common [19-20]. According to the current research the results show that the age of patients in this study ranged from 10 to 60 years. Intestinal Perforation was normally seen among the age group of 21-30 years and most common perforation was duodenal perforation (68.0%). Common risk factor of intestinal perforation was appendicitis and fever followed by trauma, inflammations and abdominal distension.

## CONCLUSIONS

This study concludes that intestinal perforation is commonly seen between the age group of 21-30 years. Common risk factors of intestinal perforation are fever, appendicitis, trauma, abdominal distension, followed by intestinal obstruction, ascites and infection. The most commonly found perforation is duodenal perforation.

## Conflicts of Interest

The authors declare no conflict of interest

## Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article

## REFERENCES

- [1] Meena LN, Jain S, Bajiya P. Gastrointestinal perforation peritonitis in India: A study of 442 cases. *Saudi Surgical Journal*. 2017 Sep; 5(3): 116-121. doi: [10.4103/ssj.ssj-33-17](https://doi.org/10.4103/ssj.ssj-33-17)
- [2] Nadkarni FM, Shetye SD, Kagzi RS. Small-bowel perforation. A study of 32 cases. *Archives Surgery* 1981; 116: 53-57. doi: [10.1001/archsurg.1981.01380130033008](https://doi.org/10.1001/archsurg.1981.01380130033008)
- [3] Gedik E, Girgin S, Taçyıldız IH, Akgün Y. Risk factors affecting morbidity in typhoid enteric perforation. *Langenbeck's archives of surgery*. 2008 Nov; 393(6): 973-7. doi: [10.1007/s00423-007-0244-8](https://doi.org/10.1007/s00423-007-0244-8)
- [4] Jindal N, Arora S, Pathania S. Fungal culture positivity in patients with perforation peritonitis. *Journal of Clinical and Diagnostic Research: JCDR*. 2015 Jun; 9(6). doi: [10.7860/JCDR/2015/13189.6050](https://doi.org/10.7860/JCDR/2015/13189.6050)
- [5] Shahid MH, Khan FI, Askri Z, Asad A, Alam MA, Ali D, et

- al. One Year of Experience Managing Peritonitis Secondary to Gastrointestinal Perforation at a Tertiary Care Hospital: A Retrospective Analysis. *Cureus*. 2022 Apr; 14(4). [doi: 10.7759/cureus.23966](https://doi.org/10.7759/cureus.23966)
- [6] Jacobs B, Jawad A, Fattah Z. Pneumatosis intestinalis and intestinal perforation in a patient receiving tocilizumab. *Archives of Rheumatology*. 2018 Sep; 33(3): 372. [doi: 10.5606/ArchRheumatol.2018.6668](https://doi.org/10.5606/ArchRheumatol.2018.6668)
- [7] Joshi P, Poudel R, Chandra K. Mannheim Peritonitis Index (MPI) score as a predictor of outcome in patients with secondary peritonitis. *Journal of Universal College of Medical Sciences*. 2016; 4(2): 6-9. [doi: 10.3126/jucms.v4i2.19083](https://doi.org/10.3126/jucms.v4i2.19083)
- [8] Afridi SP, Malik F, Ur-Rahman S, Shamim S, Samo KA. Spectrum of perforation peritonitis in Pakistan: 300 cases Eastern experience. *World Journal of Emergency Surgery*. 2008 Dec; 3(1): 1-5. [doi: 10.1186/1749-7922-3-31](https://doi.org/10.1186/1749-7922-3-31)
- [9] Chakma SM, Singh RL, Parmekar MV, Singh KG, Kapa B, Sharatchandra KH, et al. Spectrum of perforation peritonitis. *Journal of clinical and diagnostic research*. 2013 Nov; 7(11): 2518. [doi: 10.7860/JCDR/2013/5768.3596](https://doi.org/10.7860/JCDR/2013/5768.3596)
- [10] Jain U, Chauhan A, Gupta J, Gupta AK. Evaluation of Boey scoring in predicting morbidity and mortality in peptic ulcer perforation peritonitis. *International Journal of Surgery Science*. 2021; 5(3): 41-3. [doi: 10.33545/surgery.2021.v5.i3a.735](https://doi.org/10.33545/surgery.2021.v5.i3a.735)
- [11] Kallely M, Panchabhai S, Nichkaode P, Rayani H, Teja JR, Patil D. Perforation peritonitis: a clinical profile and management. *Sri Lanka Journal of Surgery*. 2020 Apr 30; 38(1). [doi: 10.4038/sljs.v38i1.8649](https://doi.org/10.4038/sljs.v38i1.8649)
- [12] Kabongo KM, Erzingatsian K. Early postoperative complications associated with perforation. 2021.
- [13] Hafner J, Tuma F, Hoilat GJ, Marar O. Intestinal perforation. *InStatPearls*. 2021 Nov.
- [14] Endo Y, Abe Y, Kawano S, Ando T, Sakamoto K, Tamura N. The association between absence of abdominal pain and mortality in lower intestinal perforation in patients with autoimmune rheumatic diseases. *BioMed research international*. 2019 Feb; 2019. [doi: 10.1155/2019/5381453](https://doi.org/10.1155/2019/5381453)
- [15] Sakaguchi T, Tokuhara K, Nakatani K, Kon M. Laparoscopic management for spontaneous jejunal perforation caused by nonspecific ulcer: A case report. *International journal of surgery case reports*. 2017 Jan; 39: 309-12. [doi: 10.1016/j.ijscr.2017.08.048](https://doi.org/10.1016/j.ijscr.2017.08.048)
- [16] Bali RS, Verma S, Agarwal PN, Singh R, Talwar N. Perforation peritonitis and the developing world. *International Scholarly Research Notices*. 2014 Apr; 2014. [doi: 10.1155/2014/105492](https://doi.org/10.1155/2014/105492)
- [17] Gupta SK, Gupta R, Singh G, Gupta S. Perforation peritonitis: a two-year experience. *Jk Science*. 2010 Jul; 12(3): 141.
- [18] Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India-review of 504 consecutive cases. *World journal of Emergency surgery*. 2006 Dec; 1(1): 1-4. [doi: 10.1186/1749-7922-1-26](https://doi.org/10.1186/1749-7922-1-26)
- [19] Gupta S and Kaushik R. Peritonitis-the Eastern experience. *World journal of emergency surgery*. 2006 Dec; 1(1): 1-6. [doi: 10.1186/1749-7922-1-13](https://doi.org/10.1186/1749-7922-1-13)
- [20] Bano F, Malik S, Soomro I. Secondary Bacterial Peritonitis. *Journal of Surgery Pakistan*. 2017 Oct; 22: 4. [doi: 10.21699/jsp.22.4.6](https://doi.org/10.21699/jsp.22.4.6)