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HOLLOW VISCUS INJURY IN BLUNT TRAUMA ABDOMEN- A COMPREHENSIVE STUDY IN SOUTHERN PART OF ODISHA, INDIA.

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ABSTRACT:

BACKGROUND: Hollow viscus injury following blunt trauma abdomen is a challenging issue from diagnosis and management point of view. This study highlights and correlates hollow viscus injury due to blunt trauma abdomen with regards to epidemiology, aetiology, pathology and management in southern part of Odisha.**AIM AND OBJECTIVE:**The prospective study was conducted for evaluation of various aetiology, epidemiology, pathology and management in southern part of Odisha.**MATERIALS AND METHODS:**Seventy number of cases who attended emergency department of General surgery of MKCG Medical College and Hospital, Berhampur from June 2019 to May 2021, were evaluated clinically with history of Blunt Trauma Abdomen and some special investigations, like (x ray, Ultrasound and CT scan).**RESULTS:**This study shows Male preponderance between 21 to 30 years of age and Road traffic accident found to be the most common aetiology, small bowel injuries are the common pathology and primary closure is the main stay of management.**CONCLUSION:**Following conclusions have been made out of this study that Hollow viscus injury following blunt trauma abdomen commonly occurs due to Road traffic accidents resulting in increased morbidity and mortality influenced by delay in diagnosis and management specially when associated with other injuries. Hence measures should be taken to prevent these accidents and for necessary care of the victims at the accident site. Well established trauma care centres should be established at least at every District hospital of Southern Odisha. Measures for early transport of the patients from the

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accident site to the trauma centre should be undertaken as soon as possible to prevent delay in management.

Keywords:Blunt abdominal trauma, Hollow viscus injuries

INTRODUCTION:

Motor vehicle accidents account for 75 % cases of blunt abdominal trauma. [1] However, the incidence of hollow viscus injuries following blunt abdominal trauma varies from 4 to 15%.[2]Hollow viscus injury has always been a challenging issues following blunt trauma abdomen pertaining to diagnosis and management.Hence in such cases, the early diagnosis remains the most important part of the management with a view to minimise morbidity and mortality.[3]Various mode of Blunt trauma abdomen leading to hollow viscus injury, varied mode of presentation, challenges in diagnosis and management entails this study more relevant in determining the outcome of such patient.[4]

AIM AND OBJECTIVE OF THE STUDY:

The prospective study was conducted for evaluation of various aetiology, epidemiology, pathology and management in southern part of Odisha.

MATERIALS AND METHODS:

Inclusion criteria:

All the patients with history of Blunt trauma Abdomen with radiologically proven hollow viscus perforation.

Exclusion criteria:

1. Patients less than 14 years of age
2. Pregnant women
3. Patients having multiple injuries (Head injuries, Blunt trauma chest etc)
4. Patients having other co morbid conditions like diabetes Mellites, Hypertension.

This prospective study was carried out in the General surgery department of MKCG Medical College and Hospital, Berhampur from June 2019 to May 2021, since it is the main tertiary health centre available in Southern Odisha.Once the patient was admitted the name, age, sex and mode of injury are noted. The time interval between injury and admission and the time interval between admission and surgery are recorded. After resuscitating the patient, careful clinical examination was done. Depending on the clinical findings, decision was taken for further investigations such as Diagnostic peritoneal lavage, X-ray abdomen erect view, ultrasound of abdomen and pelvis, CT abdomen and IVP. The decision for operative & non-operative management depended upon the outcome of clinical examination & diagnostic tests.Patients selected for conservative management were placed on strict bed rest, serial clinical examination which include monitoring of hourly pulse rate, blood pressure, respiratory rate and repeated abdominal examination.In those who would be operated, the operative findings and methods of management are recorded. Cases are followed up till their

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discharge from the hospital. Post operative morbidity, mortality and duration of hospital stay were recorded.

INVESTIGATIONS: Investigations done are CBC**,** serum Sodium,Potassium,Urea,Creatinine**,** HB_SAG, ICTC, HCV**,** Plain X-Ray Abdomen and chest in erect view, USG abdomen and pelvis**,**CT Scan abdomen**,** MRI when needed**,** Culture sensitivity in case of SSI.

RESULTS AND DISCUSSION:

A. AGE INCIDENCE:

The following table compares the incidence of blunt abdominal trauma in various age groups in the present series to that of the Davis et al.[5]In this series, out of 70 cases, the majority of the patients belonged to 21-30 years age group (28 cases).

Table 1: Depicting age group study comparison

Age Group (in year)	Present study (%)	Davis et al[5]
11-20	10	19
21-30	40	24
31-40	30	15
41-50	7	13
>50	13	9

Followed by 31-40 years age (21 cases) group comparable with Davis et al study. [5]Therefore it can be concluded that the young and the productive age group people are the usual victims of blunt abdominal trauma with hollow viscus perforation.

B.SEX INCIDENCE:

In the study it is found that, out of 70 cases,60 cases are male and female being 10 cases.

Table 2: Sex incidence comparison

Sex	Present study (%)	Davis et al[5]
Male	85.71	70
Female	14.29	30

From the above table, it can be seen that the males are the more common victims of blunt abdominal trauma with hollow viscus perforation. When compared to other studies the incidence of males is much more than those of the females, as, in India males are the chief earner for the family and are involved in outdoor activities most of the times.

C.MODE OF INJURIES:

Road traffic accidents constitute about 75% of total blunt trauma abdomen. However, fall from height constitutes 10% which is same as blow to abdomen with blunt objects. Others like bear bite and bull goring constitutes 5% of total mode of injury.

Table 3: Showing mode of injuries comparison

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Mode	Present study (%)	Davis et al[5]	Khanna et al[6]
Road traffic accidents	75	70	57
Fall from height	10	6	15
Blow to abdomen with blunt objects	10	17	33
Others	5		

The above table clearly depicts that the road traffic accident is the most common mode of injury.

D. SIGNS AND SYMPTOMS:

In the present study, abdominal pain was the most common presenting complaint accounting for 80% and abdominal tenderness was the most common sign accounting for 60% of cases. But the signs and symptoms in abdominal injuries are notoriously unreliable and are often masked by concomitant head injuries, chest injuries and pelvic fractures. Significant injuries to the retroperitoneal structures may not manifest signs and symptoms immediately and may be totally missed even on abdominal x rays in erect position. In Davis et al study, 43% of patients had no specific complaints and no signs or symptoms of intra-abdominal injury when they first presented to the emergency room. But 44% of those patients eventually required exploratory laparotomy and 34% of patients had an intra-abdominal injury. This emphasizes the importance of careful and continuing observation and repeated examination of individuals with blunt abdominal trauma.

E. LATENT PERIOD:

Latent period is the interval between the time of injury to the time of surgery. Average latent period seen in the present study is between 12-24 hours. Majority of patients (75%) were taken for surgery between 12-24 hours of latent period. 2 patients were taken for surgery after 5 days of injury as they were initially put on conservative management. Since their condition deteriorated on repeated clinical examinations, they had to be taken up for delayed exploratory laparotomy.

Table 4: Latent period

Time Interval(hours)	No. of patients (n=56)	Percentage
0-11	7	12.5
12-24	42	75
25-48	5	8.92
>48	2	3.58

- Since operative management is done on 56 cases out of 70 cases.

F. INVESTIGATIONS:

(a) Plain X-ray Abdomen erect with both domes of diaphragm:

Plain X-ray abdomen erect with both domes of diaphragm was done in 60 cases and rest 10 cases are very sick so, X-ray could not be done for those cases. Gas under the diaphragm was found in only about 42 cases.

The following table shows the findings detected in X-ray erect Abdomen of 60 cases.

Table of 5: X-Ray Abdomen erect view finding

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Features	No. of patients
Gas under diaphragm	42
Enlarged Soft tissue shadow	10
Ground glass appearance	5
Dilated bowel loops	3

The above table shows out of 60 cases in which Xray abdomen erect is done with both domes of diaphragm, Gas under diaphragm is found in 70% (42) of cases followed by enlarged soft tissue shadow which accounts for 10 cases and Ground glass appearance which accounts for 5 cases.

(b)Ultrasound Examination:

A total of 60 patients were subjected for ultrasound examination of abdomen and pelvis out of which 42 patients had scan detected hemoperitoneum which aid in confirmation of X-Ray findings and underwent exploratory laparotomy.

(c) CT Scan Abdomen:

CT Scan Abdomen was very useful in diagnosis of haemodynamically stable blunt injury abdomen patients. A total of 30 patients underwent CT scan abdomen in this study. CT Scan was able to detect small bowel perforation in 2 cases which were missed in ultrasound.

G. Organ wise injuries:

Table 6 :Organ wise injuries

Organs involved	No. of Patients(N=56)	Percentage
Stomach	2	3.57
Small bowel	28	50
Colon and rectum	14	25
Both small bowel and large bowel	10	17.85
Urinary bladder	2	3.57

Small bowel perforation constitutes highest number (50%) as compared to other hollow viscus injury in blunt trauma abdomen. Incidence of colon and rectum follows small bowel which is found in14 cases (25%). Stomach and urinary bladder injury which accounts for 3.57% both.

H. Ratio of operative to conservative treatment:

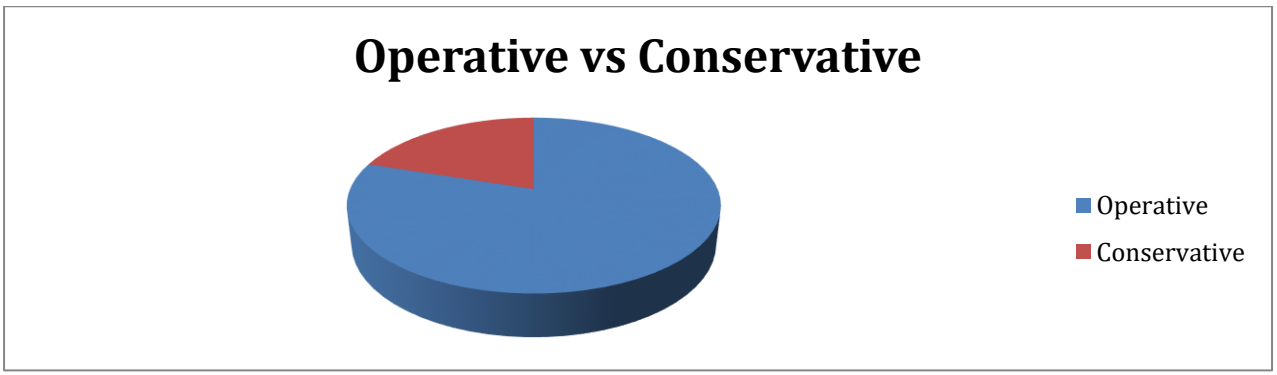

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Fig 1: Pie chart showing operative vs conservative management

After a detailed clinical evaluation and suitable investigations, 56 patients with pneumoperitoneum or hemoperitoneum with hemodynamic instability underwent exploratory laparotomy. About 14 patients were selected for nonoperative management because they had no signs of peritonitis or they had hemoperitoneum without hemodynamic instability.

I. Operative Procedures:

The following table shows the various operative procedures carried out on 56 patients who underwent exploratory laparotomy.

Table 7: Operative Procedures

Procedure	No. of patients	Percentage
Primary closure of perforation	34	60.71
Resection and Anastomosis	14	25
Colostomy	7	12.5
Bladder Repair	1	1.78

The above table shows the various operative procedures carried out among the patients who underwent exploratory laparotomy. Bowel perforations were treated with 2 layered closure, with 14 patients requiring resection and anastomosis.

Omental and mesenteric injuries associated with intestinal injuries were treated by simple suturing and ligating the bleeding points. Bladder injuries were repaired by 2 layered closures.

In the present series of 70 cases, two case of duodenal perforation was found which was simple and was closed by 2 layered closures. We could not find any case of disruption of the biliary tract and gall bladder injury in this study.

Fig 2: Ileal perforation in case of blunt trauma abdomen

Fig 3: Colostomy done in a case of colon injury after blunt trauma.

J. Post Operative Complication:

The following table shows the post operative complications in patients who underwent exploratory laparotomy. Out of 56 cases,21 cases show postoperative complications.

Table 8: Post operative complications incidence

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Complications	No. of patients(n=21)	Percentage
Wound Dehiscence	7	30
Wound Infection	7	30
Respiratory Complication	3	14.2
Intra-abdominal collection due to anastomotic leak	5	23.8

From the above table it is found that, incidence of post operative complication is found in around 35% of total cases who underwent exploratory laparotomy. Out of 21 cases wound dehiscence and wound infection accounts for 30% each followed by anastomotic leak in 5 cases and respiratory complication in 3 cases which is managed by proper antibiotics given after culture sensitivity report.

K. Morbidity & Mortality:

The mean range of stay of patients in the hospital ranged from 10-19 days. The range varied from 5 days to 35 days. The following table shows duration of hospital stay of patients with blunt abdominal trauma leading to hollow viscus perforation including those who died.

Table 9: Duration of Hospital stay

Duration(days)	No. of patients	Percentage
1-10	21	30
11-20	35	50
21-30	11	16
>30	3	4

- **Mortality:**

Seven patients of blunt trauma abdomen with hollow viscus injury died in the present study. 5 patients belonged to operative group & died in the post operative period, majority of them due to peritonitis and septicaemia.2 patients died before surgery because of severe head injuries. Therefore, the mortality rate in the present study is 10%.This is comparable with other series published in our country (Khanna et al).[17] The mortality rate in Davis et al study is 13.3%, Di Vincenti et al study was 23%.[18,19] Cox et al study reports a mortality rate of 10%.[20]

SUMMARY:

From this study, the following observations can be made. Males are predominantly affected. Male: Female ratio being 6:1. It is mostly seen in the age group of 21-30 years (40%) which form the young and productive group. These patients are usually from lower socio-economic status group.Road traffic accident forms the most common mode of injury (75%). A thorough and repeated clinical examination with appropriate diagnostic investigations should be done for successful treatment of these patients.In hollow viscus injury, operative management remains the main stay of treatment in 80% cases and conservative in 20% cases. Plain x ray abdomen erect with both domes of diaphragm is a valuable investigation taken for gastrointestinal injuries following blunt trauma abdomen.Ultrasound examination gives a clear picture of Hemoperitoneum and free fluid in

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the abdomen and also detect any solid organ injuries. Most of the Patients are diagnosed by X ray & USG findings with serial clinical examination. CT Abdomen aid in confirmation of doubtful cases.The most common injured viscera in the present study is small bowel and they were managed by simple two-layer suturing. Few were managed by resection anastomosis. Large bowel follows next most common injury and majority of them were managed by simple repair. Few of them were managed by resection anastomosis due to lack of viable bowel. Colostomy done in 7 patients.Bladder injury was seen in a small proportion of patients associated with pelvic fracture(1cases). Associated extra abdominal injuries like head, thoracic and orthopaedic injuries greatly influenced the morbidity and mortality of such patients.Post operative complications like wound infection, dehiscence, respiratory infections and anastomotic leak were also found in this study which is managed conservatively and necessary antibiotics after culture report.The mortality rate in the present study is 10%.

CONCLUSION:

Following conclusions have been made out of this study that Hollow viscus injury following blunt trauma abdomen commonly occurs due to Road traffic accidents resulting in increased morbidity and mortality influenced by delay in diagnosis and management specially when associated with other injuries. Hence measures should be taken to prevent these accidents and for necessary care of the victims at the accident site. Well established trauma care centres should be established at least at every District hospital of Southern Odisha. Measures for early transport of the patients from the accident site to the trauma centre should be undertaken as soon as possible to prevent delay in management.

BIBLIOGRAPHY:

1. *Singh S, Gupta V, Singh S, Verma R, Gupta P, Kumar A, et al. Pattern of injury of blunt trauma abdomen in rural population. International Surgery Journal. 2016 Jan 1.*

2. *Jha NK, Yadav SK, Sharma R, Sinha DK, Kumar S, Kerketta MD, et al. Characteristics of Hollow Viscus Injury following Blunt Abdominal Trauma; a Single Centre Experience from Eastern India. Bull Emerg Trauma. 2014 Oct;2(4):156–60.*

3. *Schurink GWH, Bode PJ, van Luijt PA, van Vugt AB. The value of physical examination in the diagnosis of patients with blunt abdominal trauma: a retrospective study. Injury. 1997 May 1;28(4):261–5.*

4. *Kobayashi L, Coimbra R. Trauma and injured patient. In: Cusherie A, editor. Essential Surgical Practice. 5th ed. Boca Raton: CRC Press Taylor& Francis Group; 2015. p. 280–1.*
5. *Decker GAG, Plessis D du. Abdomen. In: McGregor AL, editor. Surgical Anatomy. 12th ed. Bristol: CRC Press; 1986. p. 270–3.*

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6. *Carlson GL, Soop M. The small intestine. In: Williams N, O'Connell PR, McCaskie A, editors. Bailey and love's short practice of surgery. 27th ed. Boca Raton: CRC Press Taylor& Francis Group; 2018. p. 1248–9*

7. *Cusherie A. Disorders of Abdominal wall.Peritoneal cavity. In: Cusherie A, Hanna GB, editors. Essential Surgical Practice. 5th ed. Boca Raton: CRC Press; 2015. p. 462-64,465.*

8. *Sinnatamby C. Anatomy of gastrointestinal tract. In: Last's Anatomy. 12th ed. London: Elsevier; 2011. p. 247–9.*

9. *Mahmoud N, Bleier JIS, Aarons CB, Harris JWH, Tietelbaum EN, Mahvi DM. Abdomen. In: Townsend CM, Evers BM, Beachamp RD, Mattox KL, editors. Sabiston Textbook of Surgery. 20th Edition. Eastbourne: Elsevier; 2017. p. 1267-69,1271,1277.*

10. *Rouhana SW. Biomechanics of Abdominal Trauma. In: Nahum AM, Melvin JW, editors. Accidental Injury. New York,: Springer; 2002. p. 405–53.*

11. *Giannopoulos GA, Katsoulis IE, Tzanakis NE, Patsaouras PA, Digalakis MK. Non-operative management of blunt abdominal trauma. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine. 2009 May 13 ;17(1):22.*

12. *EE M. Resuscitation and Evaluation of Injured Patient. Pubmed. 2007;2712(6):3.*

13. *Rose R, Kheirabadi BS, Klemcke HG. Arterial blood gases, electrolytes, and metabolic indices associated with hemorrhagic shock: inter- and intrainbred rat strain variation. Journal of Applied Physiology . 2013 Mar 7;114(9):1165–73.*

14. *Md Stepehen MC, Md Mathew OD, Md Kenji I. Acute Care Surgery and Trauma : Evidence-Based Practice, Second Edition . CRC Press; 2016. 557–559 p.*

15. *Hoff WS, Holevar M, Nagy KK, Patterson L, Young JS, Arrillaga A, et al. Practice Management Guidelines for the Evaluation of Blunt Abdominal Trauma: The EAST Practice Management Guidelines Work Group. Journal of Trauma and Acute Care Surgery . 2002 Sep;53(3):602.*

16. *Mohammadi A, Ghasemi-rad M. Evaluation of gastrointestinal injury in blunt abdominal trauma FAST is not reliable: the role of repeated ultrasonography. World Journal of Emergency Surgery. 2012 Jan 20*

17. *Mackersie RC. Abdominal Trauma. In: Norton JA, Bollinger RR, Chang AE, Lowry SF, Mulvihill SJ, Pass HI, et al., editors. Surgery: Basic Science and Clinical Evidence. Berlin, : Springer; 2001. p. 825–45.*

ISSN: 0975-3583,0976-2833 VOL13, ISSUE 05, 2022

18. *Zinner M, Tavakkoli A, Ashley W S. Small intestine. In: Brunicardi CF, Anderson DK, Billar TR, Dunn DL, Hunter JG, editors. Schwartz's principles of surgery. 10th ed. New York: McGraw hill; 2015. p. 1140–2.*

19. *Lucciarini P, Öfner D, Weber F, Lungenschmid D. Ultrasonography in the initial evaluation and follow-up of blunt abdominal injury. Surgery. 1993 Sep 1;114(3):506–12.*

20. *Stengel D, Rademacher G, Ekkernkamp A, Güthoff C, Mutze S. Emergency ultrasound-based algorithms for diagnosing blunt abdominal trauma. Cochrane Database of Systematic Reviews. 2015;(9).*