ORIGINAL RESEARCH PAPER

Volume-7 | Issue-12 | December-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EFFECTS OF INTRA-ABDOMINAL HYPERTENSION ON FASCIAL WOUND DEHISCENCE IN PATIENTS OF LAPAROTOMY

Surgery

Dr. Amarnath Basu

Dr. Vaishali Gaikwad* *Corresponding Author

Dr. Sheetal Murchite

Dr. Abhinandan Kadiyal

Dr. Aniket Patil

ABSTRACT

Objective: The primary objective was to evaluate the outcome of Intra-abdominal hypertension on fascial wound dehiscence, secondarily to identify correlation with length of ICU stay.

Methods: This prospective observational study conducted in Kolhapur, included patients who were admitted in ICU for post-operative management after laparotomy. Information and data was collected on demographics, age, pre-operative grade of intra-abdominal pressure, post-operative grade of intra-abdominal pressure and the length of ICU stay.

Results: 50 patients were included, 21 (42%) patients recovered without dehiscence, 22 (44%) patients had fascial wound dehiscence, 4 (8%) patients had burst abdomen, 2 (4%) patients had died during the post-operative period and 1 (2%) patient required Laparostomy. A higher Grade of pre-operative and first 24 hours post-operative Intra-Abdominal Pressure was more likely associated with patients of dehiscence group ($P < 0.0001$).

Conclusion: IAH is strongly associated with fascial wound dehiscence. Grades of Intra-Abdominal Pressure can predict length of ICU stay.

KEYWORDS

Intra-abdominal Hypertension, Intra-abdominal pressure, Laparostomy, Dehiscence.

INTRODUCTION

Over the recent years interest in Intra-abdominal hypertension (IAH), defined as the steady increase in Intra-abdominal pressure above 12 mmHg has exponentially increased. Abdominal compartment syndrome (ACS) is defined as a sustained IAP >20 that is associated with new organ dysfunction or failure[1]. Primary IAH/ACS is said to develop in conditions associated with injury or disease in the abdominopelvic region, that requires damage-control surgery or after elective abdominal surgery[2]. This is the classic and well-known variant of ACS that is commonly dramatic and acute in onset. Conditions related to outside the abdomen (sepsis, capillary leak, major burns), or other conditions requiring increased fluid resuscitation representing the sequelae of shock resuscitation and intestinal odema formation, is defined as Secondary IAH/ACS. This is typically gradual and incidious in onset[1,2]. Recurrent IAH/ACS is said to be a "second hit phenomenon" after the recovery from primary or secondary attack[3]. Primarily the elasticity of the abdominal wall/diaphragm, the volume of the hollow viscera - solid organs and by the presence of ascites, blood or spilled enteric contents determines the Intra-abdominal Pressure (IAP). The normal adult IAP is less than 5 mmHg, but IAP in the post-laparotomy patient is typically 10–15 mmHg[3]. As IAH has been a matter of debate for the last few decades, The World Society of The Abdominal Compartment Syndrome has recommended the value of cut-off[4]. According to its severity. IAH is classified in four categories[1,4].

- **Hyper-acute:** Elevations in IAP that last but for a few seconds or minutes as a result of laughing, straining, coughing, sneezing, defecation or physical activity[4].
- **Acute**: IAH developing over a period of hours and is seen primarily in surgical patients as a result of trauma or intra-abdominal hemorrhage.
- **Sub-acute:** IAH occurring over a period of days and is most encountered in medical patients[5].
- **Chronic** in which IAH develops over a period of months (i.e., pregnancy) or years (i.e., morbid obesity, intra-abdominal tumor, peritoneal dialysis, chronic ascitis or cirrhosis) and may place patients at risk for developing either Acute or Sub-acute IAH when critically ill[5,6].

Identifying the risk factors and doing a proper assessment of IAP is the main stay.

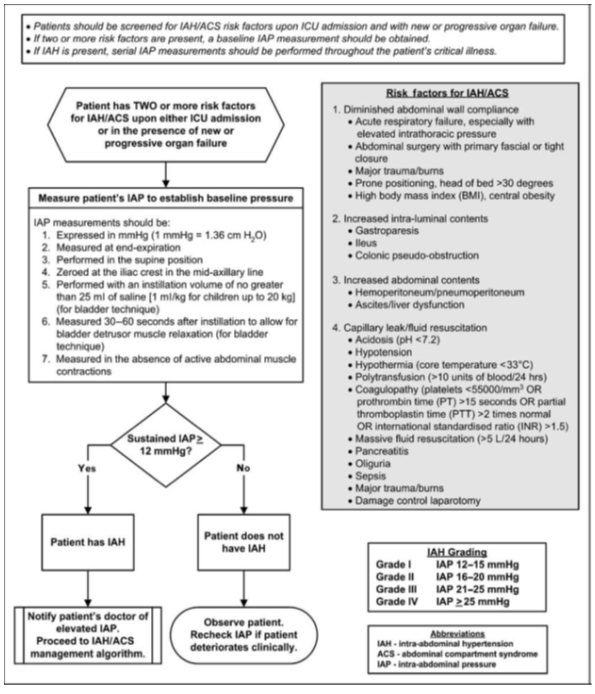

Figure 1: WSACS intra-abdominal hypertension assessment algorithm[7].

This study is primarily intended to examine the relationship between IAH and fascial wound dehiscence in patients admitted in ICU for post-operative management after emergency laparotomy. Secondary objective were to assess correlation between IAH and length of ICU stay and recognition of cases of ACS.

METHODS

This is a prospective observational study conducted in 50 patients who were admitted in ICU in the post-operative period after undergoing exploratory laparotomy. This study was conducted in Dr. D. Y. Patil Hospital and research centre, Kolhapur over a period of 24 months from October 2016 to October 2018. Information and data was collected on demographics, age, gender, pre-operative grade of intra-abdominal pressure, duration of surgery, post-operative grade of intra-abdominal pressure till the first 72 hours of the post-operative period and the ICU stay.

INCLUSION CRITERIA:

- Age > 18 years
- Both Male and Female
- All patients scheduled to undergo emergency laparotomy
- All patients with informed consent for enrollment in the study

EXCLUSION CRITERIA:

- Pregnant Women
- Patients in whom per urethral foley's catheterization is contraindicated or not possible.

IAP was measured using U-tube manometry technique via urinary bladder, according to the updated consensus definition from the World Society of the Abdominal Compartment Syndrome. Intra-Abdominal Pressure was monitored pre-operatively as well as also done every 2nd hourly up to 24 hours and then every 4th hourly up to next 48 hours in the post-operative period.

STATISTICALANALYSIS

Graphs and master chart were prepared by using MS Excel-2007. Quantitative variables are presented by percentage. To see the association of qualitative variables Chi-square test is used. Means of different quantitative variables are compound by Unpaired T-test which follows normal distribution.

DISCUSSION

Out of the total patients (n=50) who were studied, 42% (n=21) patients had uneventful recovery, 44% (n=22) patients had wound dehiscence, 8% (n=4) patients had burst abdomen, 4% (n=2) patients died within the post-operative ICU stay, one within first 12 hours and another after 72 hours and 2% (n=1) patient required laparostomy (open abdomen) due to high pre-operative IAP (Grade III).

Among the 21 recovered cases 71.42% (n=15) patients were male and 28.57% (n=06) patients were female and out of 29 dehiscence cases 51.72% (n=15) patients were male and 48.27% (n=14) patients were female with a 'P' value of 0.161. The findings of this study suggests there is no significant correlation between IAP and sex predisposition.

The mean age of the patients in the recovered group is 42.57 +/- 14.36 and the mean age of the patients in the dehiscence group is 55.86 +/- 15.81. The 'P' value is 0.0029** which is statistically significant. Although in the present study there is a significant association of age to IAP, the mean age in dehiscence group of patients is more than the recovered group because the area of population covered by the hospital is mostly sub urban area with low socio economic status resulting in delay in presentation and negligence towards medical emergencies for older age group. It could also be attributed to the increased comorbid conditions in the elderly age group.

Appropriate patient sedation and analgesia can reduce muscle tone and potentially decrease IAP to less detrimental levels. In addition to ensuring patients comfort, adequate sedation and analgesia thus play a useful therapeutic role in a patient with IAH. In patients with the significant elevations in IAP, sedation and analgesia to a level of general anesthesia is useful to overcome the increased abdominal wall tone. Every patient in this study was operated under general anaesthesia and post-operative pain management during the post-operative stay in ICU was carried out by pain management specialist from the anaesthesia team.

The mean duration of surgery in this study in both the recovered and the dehiscence group are 2.33 +/- 0.62 and 2.54 +/- 0.65. According to the Unpaired T-test the 'P' value is 0.025 which is not significant. This study also has similar results as seen in the past, there is an association of dehiscence group of patients with longer operating time.

IAP of all the patients in this study was noted and the majority 72% (n=36) were found to have Grade II IAP, 26% (n=31) had Grade I IAP and the least 2% (n=1) had Grade III IAP. Out of the 21 recovered patients 61.90 % (n=13) patients had Grade I IAP in the pre-operative period and rest 38.10 % (n=8) patients had Grade II IAP in the pre-operative period. This very well defines that lower the Grade of IAP in the pre-operative period better the chances of recovery. In this study it is noted that the lower the Grade of IAP in pre-operative period has a better recovery. Measuring the pre-operative IAP gives us a better understanding about the outcome (wound dehiscence / ICU stay) in the post-operative period. The mean pre-operative IAP among the recovered group of patients is 17.05 +/- 0.86 and among the dehiscence group is 19.66 +/- 1.01 with a 'P' value of <0.0001**. This is highly significant showing a strong correlation between the higher Grade Pre-operative IAP with dehiscence group.

As per the data collected from the 50 patients who were studied, 38.77% (n=19) patients had Grade I IAP in the first 6 hrs of post-operative period which gradually decreases to 30.61% (n=15) in the next 6 hrs, whereas 55.10% (n=27) patients had Grade II IAP in the first 6 hrs of post-operative period which increases to 59.18% (n=29) patients in the next 6 hrs. It is also seen that there is an increase in the Grade III IAP patients from 06.12% (n=3) in the first 6 hrs to 10.20% (n=5) in the next 6 hrs. It suggests that there is a noticeable increase in the Grade of IAP in the 7 – 12 hrs of post-operative period which triggers a 3 folds increase in the Grade of IAP of patients in first 24 hrs. The mean IAP of the first 24 hrs in recovered group of cases is comparatively less when compared to the dehiscence group and has a 'P' value of <0.0001**.

The mean ICU stay in recovered group of cases is 2.23 +/- 0.43 and of the dehiscence group is 4.07 +/- 1.33. The 'P' value is <0.0001** hence suggesting highly significant correlation between recovered group of patients (Lower Grade of IAP) with a lesser ICU stay.

TABLE 2: Comparison of all characters in both recovered and dehiscence group.

CHARACTERISTICS	RECOVERED	DEHISCENCE	'P' value
Age	42.57 +/- 14.36	55.86 +/- 15.18	0.0029**
Male Gender	15 (71.42 %)	15 (51.72%)	0.161(NS)
Female Gender	06 (28.57 %)	14 (48.27%)	0.161(NS)
Pre-operative IAP	17.05 +/-0.86	19.66 +/- 1.01	<0.0001**
IAP (0-6hrs)	16.38 +/- 1.28	19.67 +/- 1.54	<0.0001**
IAP (7-12hrs)	16.48 +/- 1.25	20.03 +/- 1.52	<0.0001**
IAP (13-24hrs)	16 +/- 1.38	20.25 +/- 1.81	<0.0001**
Duration of surgery	2.33 +/- 0.62	2.54 +/- 0.65	0.025(NS)
ICU stay	2.23 +/- 0.43	4.07 +/- 1.33	<0.0001**

Mean Pre-operative IAP, IAP in first 24 hours of post-operative period and the ICU stay are compared in both groups of patients and is statistically highly significant (P <0.0001**). The Mean of the dehiscence group of patients in respect to the above mentioned quantitative variables is significantly more than that of the recovered group of patients. Mean Age in both the group of patients are compared and is statistically significant (P <0.0029**). The Mean Age in the recovered group of patients is comparatively less to the dehiscence group of patients. But on the other hand the gender has no significance with the raised IAP in either of the groups.

This study has shown significant relationship of higher IAP with wound dehiscence and longer ICU stay. The study confirmed the importance and relationship of pre-operative Grade of IAP and Grade of IAP in the first 24 hrs, ICU stay, wound dehiscence and mortality in line with other observations. Unlike other studies where surgical decompressive laparotomy was performed as treatment remedy for ACS, some patients in the present series were treated with effective medical decompressive methods (nasogastric and rectal tubes, percutaneous drainage of abdominal collections, negative fluid balance with diuretics and renal support), as recommended.

Graded IAP was predictive of outcome in patients undergoing emergency laparotomy and during the ICU stay in the present study. Its true value in predicting the development of organ failure and mortality should be investigated in a study designed specifically for this purpose.

Disclosure

The author declares no conflict of interests.

REFERENCES

1. Malbrain MLNG, Chiumello D, Cesana BM, Reintam Blaser A, Starkopf J, Sugrue M et al.; WAKE-Up! Investigators. A systematic review and individual patient data meta-analysis on intra-abdominal hypertension in critically ill patients: the wake-up project. World initiative on Abdominal Hypertension Epidemiology, a Unifying Project (WAKE-Up!). Minerva Anestesiol 2014; 80: 293–306
2. Cheatham ML, Demetriades D, Fabian TC, et al. Prospective study examining clinical outcomes associated with a negative pressure wound therapy system and Barker's vacuum packing technique. World J Surg. 2013;37: 2018–30.
3. Cheatham ML, Safcsak K. Is the evolving management of IAH/ACS improving survival? Critical Care Med. 2010;38(2):402–7.
4. Kirkpatrick AW, Roberts DJ, DeWaele J, Jaeschke R, Malbrain MLNG, De Keulenaer B et al.; Pediatric Guidelines Sub-Committee for the World Society of the Abdominal Compartment Syndrome. Intra-abdominal hypertension and the abdominal compartment syndrome: updated consensus definitions and clinical practice guidelines from the World Society of the Abdominal Compartment Syndrome. Intensive Care Med 2013; 39: 1190–1206.
5. Cheatham ML, Malbrain MLNG, Kirkpatrick A, Sugrue M, Parr M, DeWaele J et al. Results from the international conference of experts on intra-abdominal hypertension and abdominal compartment syndrome. II. Recommendations. Intensive Care Med 2007; 33: 951–962.
6. Malbrain ML, Cheatham ML, Kirkpatrick A, Sugrue M, Parr M, De Waele J, et al. Results from the International Conference of Experts on Intra-abdominal Hypertension and Abdominal Compartment Syndrome. I. Definitions. Intensive Care Med. 2006;32: 1722–32.
7. Cheatham ML. Abdominal compartment syndrome: pathophysiology and definitions. Scand J Trauma Resusc Emerg Med. 2009; 17:10.