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A Prospective Study of Role of Immunonutrition in Major Elective Abdominal Surgery

Rohit Shaw[1], Manas Mukul Mandal[2], Saptarshi Poddar[3], Narendranath Mukhopadhyay[4]

[1]Former Resident Doctor, Department of General Surgery, Burdwan Medical College & Hospital, Burdwan, India.
[2]Former Resident Doctor, Department of General Surgery, Burdwan Medical College & Hospital, Burdwan, India.
[3]Junior Resident Doctor, Department of General Surgery, Burdwan Medical College & Hospital, Burdwan, India.
[4]Professor, Department of General Surgery, Burdwan Medical College & Hospital, Burdwan, India.

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ABSTRACT

Background: Immunonutrition can be defined as the usage of specific nutritional elements is greater than the normal quantity in an attempt to modulate the immune system in a way that benefits a certain injury or disease state. Aims & Objectives: The study aims to investigate the effect of Immunonutrients on patients undergoing Elective Major Abdominal surgery by assessment of changes in the clinical outcome in terms of postoperative complications compared to a normal diet. **Methods:** A prospective nonrandomized study which included 50 patients who underwent major elective abdominal surgery for both benign and malignant diseases with IMN supplementation. The study group n=50 were administered 30 gms of IMN formula three times a day for 5 days preoperatively by oral route and postoperatively when oral feeding was started for the initial 3 days. The preoperative variables measured were weight, BMI. The post-operative variables are the primary outcomes of infectious complications such as SSI, UTI, pneumonia, abdominal abscess and anastomotic leaks that were recorded in the prescribed proforma. **Results:** In this study we observed a significantly lower number of complications in the recovery period (anastomotic leak, paralytic ileus and SSI) and reduced length of hospital stay which is comparable with other literature on a similar study. **Conclusion:** The study outcome has proved a beneficial reduction of infectious complications and substantial improvement with the immunonutrient formula and it emphasizes the subset of malnourished patients is markedly benefitted.

Keywords: Gastrointestinal Surgery, Immunonutrition.

INTRODUCTION

Surgery, infection, injury and stress all these factors pose a catabolic state by the presence of inflammation and thereby depletion of conditionally essential nutrients leading to an increase in the risk of postoperative complications and eventually delay the recovery and enhance the overall morbidity of the surgical patients.

Conditionally Essential Nutrients

Our growing knowledge of the physiologic role of various nutritional elements has led to the recognition that certain nutrients, which have commonly been classified as nonessential, become essential in certain clinical situations; hence the term, "conditionally essential."

Three potential targets exist for immunonutrition–mucosal barrier function, cellular defense, and local or systemic inflammation. The nutrients most often studied for immunonutrition are arginine, glutamine, branched-chain amino acids, n-3 fatty acids, and nucleotides.[1–5] Combinations of some or all of these nutrients are present in commercially available enteral feeds. Parenteral formulas containing glutamine or n-3 fatty acids are also available commercially. Individual components of immunonutrition have been reported to preserve or augment various aspects of cellular immune function and to modify the production of inflammatory mediators.[1–5] Many clinical trials of immunonutrition in critically ill and surgical patients have been performed that used various nutrient combinations. Nearly all found that immunonutrition results in notable reductions in infections and in the length of stay in the hospital. In general, the reduced infection rate and length of hospital stay are more pronounced in surgical than critically ill patients.[8,9] Despite these apparent benefits of immunonutrition, none show a significant effect of immunonutrition on mortality across all trials considered within surgical or critically ill patients. Trials of immune nutrients indicate several beneficial clinical effects, particularly in surgical patients. However, doubts remain about the efficacy of this approach in critically ill patients, with contradictory findings among trials. Methodological differences among trials hamper comparisons.[8,9] Use of immunonutrition should be approached cautiously in the most critically ill patients.[8,9] Future efforts should try and define the most effective nutrients and optimal mixes for use in different patient groups.

The role of Immunonutrients as supplemental nutrition in elective gastrointestinal surgical patients and modulating the inflammatory response and

Name & Address of Corresponding Author
Dr. Rohit Shaw,
Former Resident Doctor,
Department of General Surgery,
Burdwan Medical College & Hospital,
Burdwan, India.
Email id: rhtshw34ssb@gmail.com

improvement in postoperative outcome is to be evaluated.

Aims and objectives:
The study aims to investigate the effect of Immunonutrients on patients undergoing Elective Major Gastrointestinal surgery by assessment of changes in the clinical outcome in terms of postoperative complications compared to a normal diet.

MATERIALS AND METHODS

Study Design: Prospective observational study
Study Area: Department of General Surgery of Burdwan Medical College and Hospital, Burdwan.
Study Population: 50 patients randomly selected undergoing major elective abdominal surgeries.
Study Period: December 2017 to May 2019.

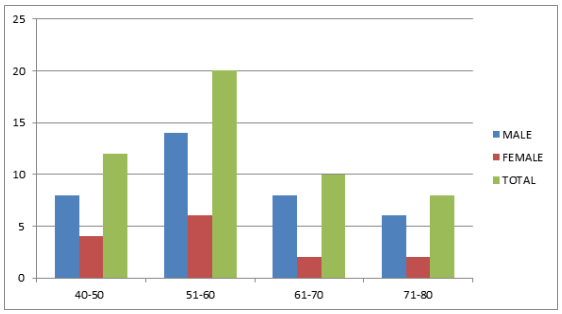
Inclusion Criteria:
All patients above 13years of age. Planned for major elective abdominal surgery.

Exclusion Criteria:
- Intestinal obstruction.
- Vomiting and diarrhea.
- Diabetes mellitus.
- Pregnancy
- Evidence of liver and renal disease

Ethical Consideration:
Strict privacy and confidentiality was maintained throughout the study. The identity of the participants will not be disclosed. Informed written consent was taken from every patient. The study was conducted after obtaining permission from the Institutional Ethics Committee (IEC).

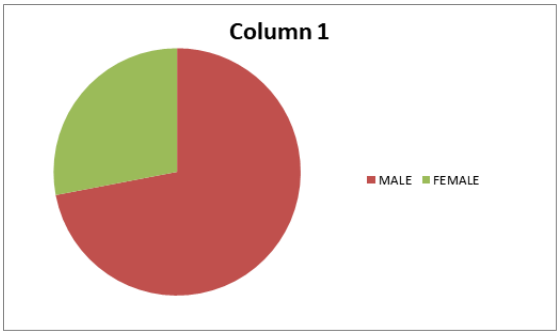
RESULTS

Age wise sex-wise distribution case group
The age of the persons varies from 40 to 80 years. The age-wise, sex-wise distribution is appended in the diagram.



The male persons are comparatively higher in number as depicted in the pie chart diagram.

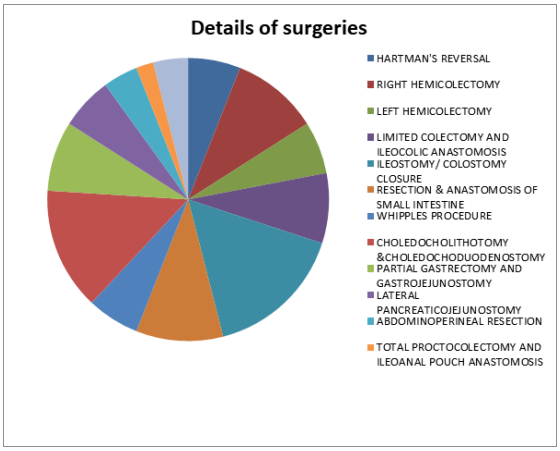
Sex wise case group



Surgeries are done as illustrated in the chart below according to the clinical diagnosis made earlier.
There were 13 types of surgeries done on 50 persons of case group- the details of which are appended below.

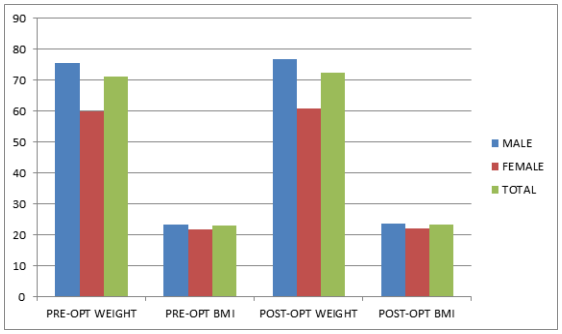
Details of the surgeries:
- Hartmann's Reversal - 3
- Right Hemicolectomy - 5
- Left Hemicolectomy - 3
- Limited Colectomy and Ileo-Colic Anastomosis - 4
- Ileostomy/Colostomy Closure - 8
- Rescection & Anastomosis of Small Intestine - 5
- Whipples Procedure - 3
- Choledocholithotomy & Choledochoduodenostomy- 7
- Partial Gastrectomy and Gastrojejunostomy - 4
- Lateral Pancreaticojejunostomy - 3
- Abdominoperineal Resection - 2
- Total Proctocolectomy and Ileoanal Pouch **Anastomosis**
- Low Anterior Resection - 2

The detailed surgeries done are best illustrated by the diagram also for easy visibility.



The impact of nutrients
The data collected on the 50 patients of the case group on parameters of weight and BMI are appended below- before and after the intervention of added Immuno nutrition by oral intake.

	Pre-Opt Mean		Post-Opt (After Intake) Mean	
	Weight	BMI	Weight	BMI
Male	75.62Kg	23.30	76.82kg	23.77
Female	59.91kg	21.78	60.97kg	22.21
Total	71.22kg	22.87	72.38kg	23.33



UTI

There was an isolated incidence in the Case group with nutrients intake and it is hence not significant.

Pneumonia

Considering the attack of pneumonia only 4 patients got suffered in the case group.

Wound infection

There were about 7 patients in the case group who suffered from post-operative wound infection. The incidence of wound infection was reduced to a great extent compared to the incidence of wound infection seen normally in the hospital.

Abdominal abscess

The groups have registered totally negative incidences during the study period.

Anastomotic Leak

There was a single incidence of anastomotic leak in the case group. The anastomotic leak was in the case of colonic anastomosis which in itself is a very high-risk anastomosis. Hence the incidence of anastomotic leak was significantly low.

Others

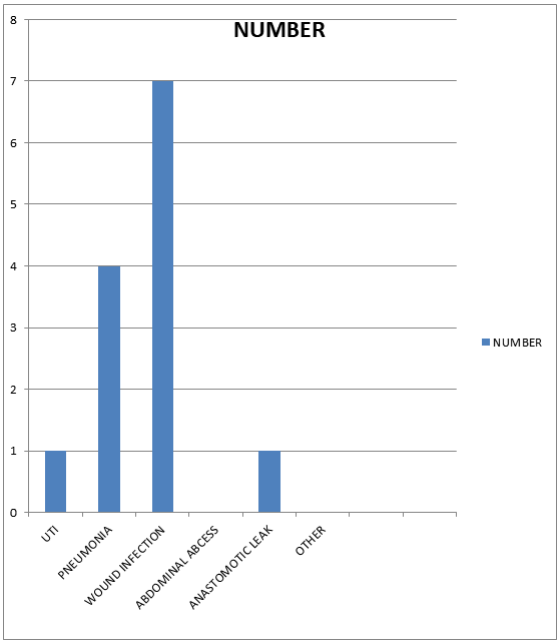
There was no incidence of any other significant complication.

Length of stay

The average hospital stay of the case group was 9.44 days including both the pre-operative period and post-operative period. This is a significantly low number in keeping in mind the severity of operations performed. The lower number of hospital stay along with the better quality of life at hospital undoubtedly help to conclude that the intervention with immune nutrients on patients has a positive impact on health. The above-said point is best illustrated by the table and the bar diagram shown below.

Post-operative complications

Symptoms	Cases
UTI	1
Pneumonia	4
Wound infection	7
Abd abcess	-
Anastomotic leak	1
Other	-



It is evident from the above data that after the intake of immunonutrients the weight of all categories of the sample group has marginally increased in spite of the expected correction on the lower side.

DISCUSSION

Multiple studies and clinical research have demonstrated improved patient outcomes and reduced length of stay, particularly in the elective abdominal surgery cases. Wound infections have marginally decreased in the study group. The patients tolerated the Immunoenriched formula due to its palatability. One patient severely malnourished following an enterocutaneous fistula had benefitted remarkably and had no complications following revision ileostomy closure. The consensus view from multiple RCT and metaanalysis supports perioperative nutritional support in elective GI surgery patients. Daly et al have conducted two studies in 1992 &1995 with surgical patients as study population and demonstrated decreased wound infections and hospital stay. Braga et al in 1998 conducted in surgical patients n=110 and demonstrated decreased length of stay and also infectious complications. "XU et al 2006" with 60 patients on preoperative IMN had fewer postoperative complications 7% vs 26%. LOS is <3 days. A study of perioperative IMN in Elective GI

surgery patients was conducted at Stanley Surgical gastroenterology unit by S.K Perumal et al with 50 patients and the observed results are there was no difference in postoperative infections but proved to be of benefit in the malnourished group. Hence the study has similarities with the malnutrition component. The different composition of the IMN formulas available commercially and utilized in numerous studies worldwide makes it difficult to comprehend the exact requirements in terms of dosage and route of administration which is beneficial in the recovery of the surgery patients. Although studies indicate that the amount of arginine required is >12 gm/1000 calories, glutamine 10 to 30gm/day, omega 3 FA 1-4 gm/day for its beneficial outcome.

CONCLUSION

The study outcome has proved a beneficial reduction of infectious complications and substantial improvement with the immunonutrient formula and it emphasizes the subset of malnourished patients is markedly benefitted.

REFERENCES

1. Suchner U, Heyland DK, Peter K. Immune-modulatory actions of arginine in the critically ill. Brit J Nutr2002;87: s121-32.
2. Andrews FJ, Griffiths RD. Glutamine: essential for immune nutrition in the critically ill. Brit J Nutr2002;87: s3-8.
3. Calder PC. Dietary modification of inflammation with lipids. Proc Nutr Soc 2002;61: 345-58.
4. Grimble GK, Westwood OM. Nucleotides as immunomodulators in clinical nutrition. Curr Opin Clin Nutr Metab Care 2001;4: 57-64.
5. Suchner U, Kuhn KS, Furst P. The scientific basis of immunonutrition. Proc Nutr Soc 2000;59: 553-63.
6. Beale RJ, Bryg DJ, Bihari DJ. Immunonutrition in the critically ill: a systematic review of clinical outcome. Crit Care Med 1999;27: 2799-805.
7. Heys SD, Walker LG, Smith I, Eremin O. Enteral nutritional supplementation with key nutrients in patients with critical illness and cancer–a meta-analysis of randomized controlled clinical trials. Ann Surg1999;229: 467-77.
8. Heyland DK, Novak F, Drover JW, Jain A, Su XY, Suchner U. Should immunonutrition become routine in critically ill patients? A systematic review of the evidence. JAMA 2001;286: 944-53.
9. Griffiths RD. Specialized nutrition support in the critically ill: for whom and when? In: Labadarios D, Pichard C, eds. Clinical nutrition: early intervention. Basel: Karger, 2002: 199-217.
10. Galban C, Montejo JC, Mesejo A, Marco P, Celaya S, Sanchez-Segura JM, et al. An immune-enhancing diet reduces mortality rate and episodes of bacteremia in septic intensive care unit patients. Crit Care Med 2000;28: 643-8.
11. Gadek JE, DeMichele SJ, Karlstad MD, Pacht ER, Donahoe M, Albertson TE, et al. Effect of enteral feeding with eicosapentaenoic acid, γ-linolenic acid, and antioxidants in patients with acute respiratory distress syndrome. Crit Care Med 1999;27: 1409-20.
12. Weiss G, Meyer F, Matthies B, Pross M, Koenig W, Lippert H. Immunomodulation by perioperative administration of n-3 fatty acids. Br J Nutr 2002;87: s89-94.
13. Grimble RF. Nutritional modulation of immune function. Proc NutrSoc 2001;60:389-397.
14. Akbarshahi H, Andersson B, Nordén M, Andersson R. Perioperative nutrition in elective gastrointestinal surgery-potential for improvement? Dig Surg 2008;25:165-174.
15. Suchner U, Kuhn KS, Fürst P. The scientific basis of immunonutrition. Proc Nutr Soc 2000;59:553-563.
16. Lewis SJ, Andersen HK, Thomas S. Early enteral nutrition within 24 h of intestinal surgery versus later commencement of feeding: a systematic review and meta-analysis. J Gastrointest Surg 2009;13:569-575.
17. Bounous G. Whey protein concentrate (WPC) and glutathione modulation in cancer treatment.
18. Gianotti L, Braga M, Fortis C, Soldini L, Vignali A, Colombo S, et al.A prospective, randomized clinical trial on perioperative feeding with an arginine-, omega-3 fatty acid-, and RNA-enriched enteral diet: effect on host response and nutritional status. JPEN J Parenter Enteral Nutr 1999;23:314-320.
19. Braga M, Gianotti L, Nespoli L, Radaelli G, Di Carlo V. Nutritional approach in malnourished surgical patients: a prospective randomized study. Arch Surg 2002;137:174-180.
20. Weimann A, Braga M, Harsanyi L, Laviano A, Ljungqvist O, Soeters P et al. ESPEN Guidelines on Enteral Nutrition: Surgery including organ transplantation. Clin Nutr 2006;25:224-244.

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