Complications of Total Parenteral Nutrition in Surgery

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From May,95 to November,96 twenty two patients (18 males & 4 females) were on total parenteral nutrition (TPN) for more than seven days at West Surgical Unit, Mayo Hospital, Lahore and a note was made of the complications encountered specifically due to total parenteral nutrition. Fecal fistula was the leading indication for total paranteral nutrition (55%) and among them ileal fistula was the commonest (66%). Complications due to central venous line were encountered. Those resulting from total paranteral nutrition were hyperglycaemia, hypoglycaemia, hyponatraemia, apathy, fits, coagulopathy etc. One patient died (4%). 23% cases were abandoned half way and success rate was 68%. We noted complications tend to come on in " clusters". Also the lack of adequate monitoring was observed. Total Parenteral Nutrition should be given when gastrointestinal tract is unavailable, unreliable or being rested. Stress is laid upon monitoring Total Parenteral Nutrition delivery. Total Parenteral Nutrition is expensive; but total parenteral nutrition is beneficial.

Keywords: TPN, Total Parenteral Nutrition

Total parenteral nutrition (TPN) is traditionally given to patients when the gastrointestinal track is non-available, un-reliable or being rested[1] (prolonged ileus, acute pancreatitis). This usually involves selecting the patients, calculating the fluid intake per kilogram body weight followed by caloric needs, nitrogen : calorie ratio[1,2,3] selecting the available solution and the root of administration (usually a subclavian central venous line)[4] The recommended period is 2-6 weeks unless home parenteral nutrition is indicated which may be indefinite. Therefore total parenteral nutrition may be fraught with complications namely haemodynamic[5], osmotic, endocrine, acid base balance, electrolyte imbalance[5] gut mucosal atrophy and bacterial translocation[6,7,8]. All this is over and above the parent disease and a definite morbidity due to central venous line. This study was carried out to know the complications of total parenteral nutrition in our general surgical wards.

Material and Methods

Twenty two patients, 18 males and 4 females with age ranging from 14 years to 65 years (average 26.8 years) who were admitted to West Surgical Ward, Mayo Hospital, Lahore over a period of 18 months (May,95 to Nov.,96) and were on total parenteral nutrition (TPN) for more than seven days entered the study.

The patients had already been worked up for the original disease. The patients when selected for TPN received through a subclavian line 45-55 Cal/Kg body weight, 55-65 ml of water/ Kg, 0.2-0.3 grams of Nitrogen / Kg, carbohydrate: fat ratio of 70:30, Nitrogen : Caloric ratio of 1:150-250 as well as basic electrolytes and trace elements. Insulin and Heparin were also given. The preparations used were the standard ones in the market.

The patients were monitored for daily progress by history, physical examination (pulse rate, blood pressure, temperature, intake/output charts, skin and malar flush etc.) and laboratory investigations. The investigations were sent approximately as follows:

Daily serum electrolytes, blood sugar,

Twice weekly full blood count, blood urea, urinalysis

Once weekly liver function tests, prothrombin time, activated partial thromboblastin time, serum proteins,

Every ten days serum calcium.

Erratic body weight,

Central venous line was removed and inserted at a new site if it was the cause of fever by exclusion. The tip was sent for culture sensitivity and antibiotic therapy was modified.

TPN was discontinued if :

(a) The purpose of TPN was served.

(b) The complications precluded further TPN.

In case of (a) the TPN was tapered and overlapped with stepwise enteral feeding. A note was made of complications of total parenteral nutrition (described in the study) and were treated accordingly.(not a part of this study).

Exclusion Criteria:

(i) TPN < 7 days.

(ii) Supplemental parenteral nutrition in addition to partial enteral feeding.

Results:

Table 1: TPN break up

Indication for TPN (n=22)	n=
• Fecal fistula (Local & referred) ileal (8 mostly typhoid) jejunal (3) leaked colostomy closure (1)	12
• Duodenal fistula	3
• Gastric fistula post splenectomy (1) leaked suture line (trauma (1) leaked esophagogastrotomy (1)	3
• Pre-operative for gastric outflow obstruction	2
• Prolonged ileus	1
• Acute pancreatitis	1

Table 2. Complications of TPN

Complications	n=
C.V. Line	
• arterial puncture	3(14%)
• pneumo/hydrothorax	2(9%)
• catheter kinking/knotting	3(14%)
• "line sepsis"	5(23%)
• cardiac arrythmia	1(4%)
• failure	2(9%)
TPN	
• hyperglycemia	8(36%)
• hypoglycemia	1(4%)
• apathy	7(32%)
• hyponatremia	8(36%)
• hypokalemia	2(9%)
• flushing	7(32%)
• coagulopathy	2(9%)
• septicaemia	3(14%)
• fits	2(9%)
• coma	1(4%)
• death (attributed to TPN)	1(4%)
• "success rate"	15(68%)
• abandoned half way	5(23%)

cost - 3 Cal ~Rs.2/-

Discussion

In selected patients, TPN is of benefit[1]. The morbidity[5] is rather high[9]. When indicated, there are few alternatives. Hence, careful administration seems important[1]. Complications may prohibit further TPN, if the patient fails to adapt.

We encounter a number of complications even in a system which lacks in facilities to monitor adequately. CVL-related complications are part and parcel of TPN-related ones. TPN interacts with the parent disease and therefore the causes of these complications may be interrelated. We have however tried to mention these where we could attribute them directly to TPN.

Hyperglycemia and hyponatraemia were important complications and were often difficult to treat. We attribute the former to stress- induced transient insulin - resistance as well as a diabetogenic hormonal set-up. The latter may have been due to underestimation of sodium requirements as sodium replacement for upper gastrointestinal losses, fever and fistula aspirate were perhaps inadequate.

Central venous "line sepsis" is probably commoner than thought. (23% in this study). It is the CVL induced septicemia which may be rather less common. Although three patients (14%) had septicemia seemingly due to TPN, we did not have the arrangements to determine if it was due to mucosal atrophy[10-12] and gut barrier transaction of bacteria. TPN had to be discontinued in all three of them which led to return to pre-morbid level.

Apathy and malar flush were quite common.(32%) were associated with a higher incidence of complications and might have represented sub-clinical septicaemia.

We did not encounter a fluid overload , CCF or tetany during this study but attacks of disorientation , hallucination , fits and convulsions were witnessed. They were common in second to third week of TPN and since basic parameters were normal , they were attributed to a possible trace element deficiency.(Magnesium? Zinc?? Copper??). A patient did die as a consequence of TPN. Death during this period may also be due to an unsuspected pulmonary embolism especially in an aura of hyper osmolar I/V fluids.

In 23% cases TPN was abandoned either due to mounting complications or being expensive (see table 2) . Considering 68% were on TPN successfully, it can be said that one complication makes way for another and the patients who would get them cannot be predicted and mode of selection for complication is bizarre. Complications with TPN generally deteriorated the overall prognosis.

"GIT is the best" and must be called for as soon as available and is reliable. Switching on to TPN is an important decision and may be a big injury on to the patient in itself as it may lead to potentially serious complications. However, where indicated there are few options to TPN and then it should be administered in a planned manner. "Monitoring" may be the catchword.

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