

# Whipples procedure essay



**ASSIGN  
BUSTER**

Admitting Diagnosis: Ca of the Duodenum W. F. is divorced and lives alone in a private dwelling. He has worked as a city bus driver for the past 10 yrs and plans to return to his job when he is able. W. F. also works part time as a carpenter with a friend doing custom carpentry after his day job ends.

W. F. received support by regular visits from his girlfriend and family located in the city. Other family members live elsewhere but were in contact with him.

W. F. was a pack/day smoker for approximately 30 yrs and is currently trying to quit he also usually has 2 beer or glasses of wine/day after work with supper. W. F. has had an appendectomy as well as nasal surgery 1991 to correct his snoring difficulties.

In the summer of 1995 W. F. experienced heartburn & epigastric pain and was diagnosed (Dx) with having an active duodenal ulcer and treated with Histamine H2 receptor blocking agent Ranitidine to reduce gastric acidity and alleviate the ulcer. The symptoms eased but persisted so in August 1996 the Dr. booked W. F. for a gastroscopy and a biopsy was taken from the lesion. At this time a Dx of Adenocarcinoma, moderately differentiated, was made.

The occurrence rate of cancer of the small intestine in Canada is approximately 17/100, 000. Adenocarcinoma of the small intestine is said to form less than one percent of all intestinal carcinomas but is the most common small intestinal malignancy (1). Epidemiological studies have shown that there are many different possible causative agents for the development of cancer. They include viruses, a wide variety of chemicals, both ionizing

and ultraviolet radiation, and even inherited forms of tumors such as retinoblastoma (1). The common element amongst all the causative factors is that they cause damage to or alteration of the DNA in the cells leading to improper reproduction of the genetic information in the next cell generation (1).

Most normal cells are differentiated, a term that indicates that they have developed specific morphology and function. A series of errors in the reproduction of the DNA can lead to a reduction in the degree of differentiation i. e. the loss of original morphology or function. In a cancer cell, proliferation usually continues independent of a requirement for new cells and as differentiation decreases the cells begin to adopt proliferation as their primary function (1).

Early diagnosis is necessary for the successful treatment of cancer. If the cancer has metastasized, the prognosis for survival is not good. It has been shown that in patients with staged tumors the only patients who survived 5 years were those without lymph node involvement, which is an indicator of a lack of metastasization (2).

If the cancer is caught early it can be destroyed or removed while it is still isolated (1). Nutritional intervention therefore is concerned with the type of treatment and the location of the cancer (3). The three traditional treatments for cancer are radiation, surgical removal of the cancer and chemotherapy. Each has specific consequences which can predispose the patient to nutritional problems based on the location of tumors and the type of treatment used (3). A full list of possible nutritional consequences is given in

Appendix A as well nutritional problems based on location of tumor and type of treatment are shown in Appendix B.

The majority of patients with preampullary neoplasms are candidates for operative resection of the tumor. This treatment is usually followed by a combination of radiation and chemotherapy which has show to prolong survival after curative Whipple resection (4).

Duodenal tumors are often asymptomatic but when symptoms do arise, they are usually related to either obstructive phenomena or bleeding. Epigastric discomfort or cramping pain associated with nausea and/or vomiting can increase with the severity of the lesion while preampullary tumors may be associated with painless jaundice. Weight loss is also a common symptom of these tumors (4). Cancer of the head of the pancreas and three periampullary neoplasms ( ampullary carcinoma, duodenal carcinoma, and carcinoma of the distal common bile duct ) are the most common reasons this procedure is done. All of these have been found to have similar risk factors for their development. These include cigarette smoking, diabetes mellitus, industrial exposure to chemical irritants, alcoholism, dietary factors, exposure to radiation, and ethnic and racial factors (3)The Whipples procedure is the standard for removal of a duodenal or preampullary carcinoma. It involves a pancreaticoduodenectomy, first described by Whipple in 1935. The procedure involves the resection of the head of the pancreas, the distal portion of the common bile duct, the distal portion of the stomach, and the entire duodenum. A segment of the jejunum is brought up and sewn to the remaining portion of the stomach, common bile duct, and pancreas to maintain the integrity of the gastrointestinal tract (3). A diagram

of the reconstructed intestinal tract with the resected specimen can be found in Appendix F. This procedure has a perioperative mortality of less than 5 percent as evidence of its low risk and safety. At present the overall 5 year survival rate for recipients of the Whipples procedure is 15 to 25 percent but the survival rate of individuals with resectable cancers of the duodenum is 40 to 60 percent (4). There is currently an optional method of performing the procedure which preserves the pylorus of the stomach in an attempt to alleviate some of the gastrointestinal problems associated with the procedure (4). While there is no difference in the survivability rates between these two modalities there are some differences in the nutritional/digestion and absorption concerns created by the procedure (5).

A common concern for post Whipples procedure patients is dumping syndrome which is the early emptying of the stomach contents into the gastrointestinal tract leading to possible symptoms of nausea, weakness, sweating, palpitation and often diarrhea (6). The pylorus preserving method was theorized to prevent this and research has shown that patients with this procedure do not show the tendency towards dumping (7). This version of the procedure also helps to prevent enterogastric reflux (7) and has shown to improve the nutritional repletion of both the body weight and the serum albumin level at 6 months after discharge over that experienced by patients with pylorus resection (8). The pylorus resecting method does not cause a large amount of dumping to occur due to the loss of duodenal and pancreatic hormones that effect upper gastrointestinal motility but it does however allow for enterogastric reflux by removing the blocking action of the pylorus (7). There is also a reduction in gastric volume from the resection of the

lower portion of the stomach which leads to a feeling of fullness and early satiety. The early satiety can lead to an insufficient intake of food and if the patient attempts to eat preoperative amounts they can precipitate the dumping (9). The pylorus resecting method may indirectly reduce the late dumping syndrome side effect of a hypoglycemic rebound. This due to excess insulin released in response to the rapid uptake of the carbohydrates dumped into the small intestine which can occur in gastric resection alone (6). The resection causes a reduction in insulinotropic hormones such as gastrin and gastric inhibitory polypeptide. This leads to a reduction in the reaction time of insulin release and can reduce the excess insulin level thereby avoiding the hypoglycemic rebound. Whether there is dumping syndrome or not the hormone alteration will cause a slightly elevated blood glucose level (110 - 120 mg/dl ) = ( 6. 16 - 6. 72 mmol/L) that will last approximately 1 & 1/2 to 2 hours (10). The pylorus resecting method may also lead to anemia over the long term as a possible insufficiency of intrinsic factor necessary for vitamin B12 absorption can occur depending on the degree of gastric resection (6).

Other nutritional concerns stem from the resection of the pancreas. This is due to the fact that the pancreas is the source of both the exocrine secretion of many of enzymes necessary for digestion and the endocrine secretion of insulin necessary for blood glucose control. However research has shown that not until exocrine pancreatic secretion has been reduced by more than 90% of the normal secretion does maldigestion with steatorrhea result (11). Diabetes mellitus can be the result of insufficient insulin however it does not usually develop until more than 70% of the pancreas is removed (3).

The removal of the gallbladder may also effect the nutrition of the patient post operativly by restricting the amount of bile salts necessary for fat digestion and absorption leading to steatorrhea (3).

To reduce the risk of dumping syndrome and to ensure adequate nutritional intake the patient is encouraged to eat small, frequent, dry meals with fluids taken at least half and hour before and one hour after the meal. Limiting of simple sugars which can increase the rate of gastric emptying will also aid in avoiding dumping from occurring. As well a low fat diet may initially be required to avoid steatorrhea (3).

If there are signs of malabsorption the patient will require enzyme replacement. There are many types available and the amount required will depend on the degree of insufficiency which can be determined by pancreatic functional tests such as serum-PLT or PABA test or measurement of stool fat (11). Joanne Franko PDt at St. Pauls hospital stated that the standard practice is to give 3 enzyme tablets with meals and 2 with snacks to ensure adequacy.

If the patient shows signs of blood sugars over 11. 1 mmol/l without any other contributing factors, they can be considered diabetic and will require insulin. While values that are consistently above the normal range of 5. 5mmol/l may require oral glycemc agents to help control the blood sugar levels (12). If the patient shows signs of anemia a test for B12 deficiency such as the Shillings Test should be performed and if a deficiency is discovered the patient will need regular injections of B12 for the rest of their life (6).

The two most common complications of the procedure are sepsis and loss of the integrity of the anastomoses created. The control of the sepsis is managed with antibiotics specific to the infecting agent (4). The healing of the anastomoses can be aided through the use of agents that block pancreatic secretions especially the proteases. The use of the hormone somatostatin to block exocrine excretion following a Whipples procedure was first done in 1979 and resulted in a decrease in complications. Since then the synthetic somatostatin analogue, octreotide, has been used for this purpose since it is cheaper and has a 1/2 life of 90 min. compared to somatostatins 1/2 life of 1 min. (13) The effectiveness of this treatment can be seen in Appendix C which shows its effect on the 11 most common complications of the procedure. It can clearly be seen that it reduces the occurrence of all 11 and as such is an important part of the gastrointestinal therapy (14).-

Booked for Whipples Procedure to remove Ca- Preadmission Lab Values from Medical Arts 17/ 09 1996 WBC: 6. 0, Hgb: 152, Na: 139, K: 4. 3, Cl: 105, Urea: 5. 3, Creat: 80, Random Glucose: 5. 1- Specimen removed includes 4cm portion of stomach, duodenum, 12cm of small bowel, pancreas portion 4. 0 X 3. 0 X 2. 5cm, gallbladder- No evidence of metastasis to lymph nodes- Placement of feeding jejunostomy tube, 2 Jackson Pratt tubes to drain anastomoses, naso gastric tube for gastric suction, and foley catheter Diet Hx showed W. F. had a fairly regular intake of approx. 1600-2000 kcal per day plus a low daily intake alcoholic beverages which contributed to his caloric intake but could not be assessed due to the variability of intake. W. F. stated he had experienced a loss of appetite 1 month previous to admission which he attributed to nervousness about his upcoming operation and lost approximately 10 lbs.



W. F. was right at the top end of his ideal Wt for Ht range from the Metropolitan Life Tables. His diet history showed an adequate intake which correlated with his weight and therefore he did not seem to be at nutritional risk.

Using the Harris Benedict equation W. Fs REE was assessed at 1700 kcal/day and using stress factors of 1.4 - 1.5 gave a range of approximately 2400 - 2550 kcal/day energy requirement. His protein requirements were assessed at 1.3 - 1.4g/kg of body Wt giving a range of 101 - 109g/day There were no contraindications to using an intact tube feed formula that was isomolar and since the location of the tube feed presented no danger of aspiration, a noncolored formula would be appropriate. As a result Osmolite HN was selected from St Pauls list of available products to use as the enteral feeding product. It was calculated that 95ml/hr of Osmolite HN would provide 2400 kcal/day with 100g Pro/day and 1938 ml fluid which would meet the patients assessed needs. The recommendations for tube feed (T. F.) were set at 25ml/hr full strength for 24 hr then an increase to 50 ml/hr full strength for 8 hr then to 75ml/hr full strength for 8 hr then to the max rate of 95 ml/hr full strength. 1. Maintenance of weight is an indicator of whether the patient is receiving adequate nutritional support therefore W. F. would have to be weighed throughout his hospital stay.

2. Endocrine sufficiency of insulin production would be assessed by chem strip testing of the blood sugar levels to check if diabetic intervention would be necessary 3. Exocrine sufficiency of digestive enzymes and the need for enzyme replacement therapy could be assessed by the presence of steatorrhea and associated weight loss.

4. Dumping syndrome could be assessed by the presence of its symptoms once the patient returned to an oral diet.

26/09 W. F. NPO preoperative; Surgical procedure completed; 27/09W. F. in ICU; stable condition; NPO; tube feed recommendations from assessment placed in chart; chem strips started QID X 48hr28/09W. F. sitting up and standing; no edema present; chem strips D/C; NPO29/09W. F. transferred to ward; NPO30/09Dr. orders jejunal tube feed initiation for the following daywith a reduction in IV; temperature begins to increase.

01/10W. F. has a fever; T. F. held due to concern of leakage02/10W. F. sent to x-ray to check for leakage of anastomoses; no anastomoses present; T. F. initiated at 25ml/hr; 03/10W. F. still disoriented and feverish; T. F. increased to 60 ml/hr in am.; T. F. increased to 90 ml/hr max. in pm04/10W. F. very disoriented and feverish05/10W. F. very disoriented; trying to crawl out of bed and disconnect his I. V.; hands and feet restrained for own06/10W. F. Still disoriented and restrained07/10W. F. experiencing diarrhea; x-rays to check for dehiscing of theanastomoses are taken; no dehiscing found08/10W. F. condition improving; Temp. more stable09/10W. F. oriented with time and place again; condition stable10/10W. F. weighed; Wt: 73kg which is down 5kg from admission; request made to increase T. F. to 100ml/hr toprovide 2520 Kcal/d & 108 g pro/d; feed increased15/10W. F. condition stable; patient asked to take own weight and22/10Wt down 3 kg from October 10; request T. F. increase to110ml/hr to provide 2772 Kcal/d & 118. 8 g pro/d23/10T. F. increased to 110ml/hr; Dr. starts W. F. on clear fluids; Wt: 69kg24/10W. F. placed on Full Fluids; T. F. decreased to 75ml/hr; by supper diet increased to DAT low fat 6 small28/10Wt: 69. 5; W. F.

tolerated diet well over weekend; cal count initiated; W. F. taught low fat diet with 6 small meals; follow up appointment made; W. F. discharged  
Outpatient follow up visit, 07/11/1996.

Wt: 71kg (with clothes on), W. F. states that his appetite is good and he is eating 3 meals plus snacks daily but finds food tends to sit there. W. F. Wt is stable and he is trying to stay on a low fat diet. W. F. is given information on how to increase the nutrient density of his oral intake. W. F. states he is booked to start chemo in Jan. He is told to call if he needed any further help with his diet.

Most of W. F. lab values show no outstanding cause for concern on a nutritional basis. His white blood cell count showed the extent of sepsis he experienced and correlated well with the dates of his high Glucose Serum Testing (GST) values which shows that the sepsis is reason that they are elevated and not pancreatic problems.

W. F. was on many medications during his stay in hospital but most are of no nutritional concern. Only the use of octreotide to block exocrine excretion for the promotion of wound healing has any direct effect on the digestive process.

In retrospect, the upper range of W. F. s assessed nutritional requirements should have been used to start with since he experienced weight loss through most of his stay. The maximum rate was only placed at 90 ml/hr by the doctor giving less than was calculated originally which compounded the effect of the initial under assessment. The sepsis experienced by W. F. did however make his requirements higher than were initially calculated and this

event could not be accounted for in advance and could only be dealt with as it occurred.

Osmolite HN was an appropriate choice as there were no contraindications to using an intact nutrient formula. As well the patients assessment did not show a special requirement such as a high protein intake that could not be met by Osmolite HN. Since there were no special needs, the nutritional content of Osmolite HN was in an adequate proportion to the patients needs for energy and protein. This allowed for subsequent reassessed needs to be met with changes in the flow rate without modification of the formula.

Since the lab values showed no obvious signs of insufficiency, the subsequent increases in the rate of tube feed only began after the patient was able to be weighed in order to assess the inadequacy of the intake. Monitoring of the weight followed to assess need for further adjustments which were made as necessary.

There was no need for enzyme therapy as no steatorrhea or evidence of pancreatitis was present during the patients stay in hospital.

The GSTs showed slightly elevated values but these could be explained by the presence of the extreme sepsis the patient experienced. As well some increase in blood sugars from the delayed response to glucose from a loss of insulinotropic factors is expected (12). Therefore no need for diabetic intervention was indicated.

The meal plan and diet education given to W. F. to follow were appropriate for a post Whipples procedure patient and the follow-up appointment verified

this by the fact that W. F. s weight was stable over the weeks since his discharge.

While there are many possible nutritional concerns for a patient undergoing a Whipples Procedure, they are dependent on the degree of resection of the various components of the digestive tract and associated systems. The only problem W. F. experienced was the infection which may have temporarily increased his needs and caused him discomfort. This however did not cause him to develop any of the deleterious nutritional complications that are possible with this procedure.

The upper end of the patients assessed requirements should have been recommended to help ensure adequacy, however as previously discussed there were unforeseeable occurrences that affected W. F. s requirements as well.

The long term prognosis looks good for W. F. since there was no evidence of metastases in the lymph nodes surrounding the cancer and W. F. seems to be adapting to his new diet and maintaining his weight which indicates that there is probably no concern for nutritional inadequacies at this time. Since he was booked for chemotherapy in January, problems could arise as a result of that treatment. 17/09 6. 01521394. 31055. 3805. 126/0920. 4H1481364. 91064. 394-27/0915. 3H130L1374. 71104. 9966. 7H28/0915. 8H107L1383. 81083. 6L81-29/0916. 1H103L1413. 71093. 4L85-01/1019. 8H106L1354. 01013. 297-04/1014. 5H 86L1374. 01022. 6L75-06/1013. 9H 89L1394. 11041. 5L70-? Inhibitors of digestive secretions:- Octreotide, Famotidine,

Ranitidine- Cefuroxime, Ampicillin, Gentamycin, Cefotaxime,? Antipsychotics  
& relaxants:- Haloperidol, Halidol, Librium, Lorazepam, Bibliography: