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**TRATAMENTO DE FÍSTULAS ENTEROCUTÂNEAS ATRAVÉS DE
SISTEMA A VÁCUO COM ALTA PRESSÃO E DIETA ORAL
NORMAL**

Tese apresentada ao Programa de Pós-graduação em Ciências da Saúde da Universidade Federal do Rio Grande do Norte, como requisito para a obtenção do título de Doutor em Ciências da Saúde.

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**TRATAMENTO DE FÍSTULAS ENTEROCUTÂNEAS ATRAVÉS DE SISTEMA A
VÁCUO COM ALTA PRESSÃO E DIETA ORAL NORMAL**

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Dedicatória

Dedico este trabalho a todos os pesquisadores que, muitas vezes com condições mínimas, produzem conhecimento de excelência e com reconhecimento dos seus pares.

*À minha família, especialmente ao meu pai **in memoriam**, por termos chegado aonde chegamos*

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RESUMO

Objetivos: As fístulas enterocutâneas são associadas com hospitalização prolongada, alta morbidez e mortalidade, e aumento dos custos hospitalares. Foi realizado estudo com o objetivo de analisar o uso de um sistema a vácuo e dieta oral normal para o tratamento dessas fístulas. **Métodos:** Foram analisados setenta e quatro pacientes consecutivos portadores de fístulas enterocutâneas pós-operatórias, recentes e bem definidas. Exames abdominais por imagem foram usados para excluir abscesso e obstrução intestinal distal. O trajeto fistuloso foi fechado com sonda de Foley conectada a um frasco de pressão negativa, que era trocado diariamente por 5, 10 ou 15 dias, conforme necessário. Foi permitida dieta oral normal a todos os pacientes. **Resultados:** Nenhum paciente morreu. Os níveis de albumina e transferrina sérica mostraram-se significativamente mais elevados no final do tratamento, quanto comparado com seu início. As fístulas de débitos baixo e moderado atingiram os melhores resultados e 97% delas fecharam. Quarenta e oito (65%) fístulas fecharam após 5 dias, 16(22%) após 10 dias e 4(5%) após 15 dias de tratamento. O sistema falhou em 6(8%) pacientes, que subsequentemente foram submetidos a intervenção cirúrgica. Apenas em um paciente com fístula de baixo débito não se conseguiu resultado satisfatório. O tratamento teve o custo diário de R\$ 108,55 e foi considerado baixo e efetivo. **Conclusões:** O sistema a vácuo utilizado demonstrou bons resultados no tratamento das fístulas. Caracterizou-se por simplicidade na execução, baixo custo, curto período de hospitalização, ausência de lesões cutâneas, dieta normal, bom estado nutricional, mobilidade e atividades normais dos pacientes. **Palavras chave:** Fístulas enterocutâneas, Tratamento, Sistema a vácuo, Dieta oral.

1 INTRODUÇÃO

Fístula gastrointestinal é uma comunicação anormal entre dois órgãos ocos ou entre um órgão oco e a superfície corporal, que permite a passagem de líquidos ou secreções. Assim, a perda de conteúdo gastrointestinal, incluindo sucos digestivos, água, eletrólitos e nutrientes pode ocorrer de uma área do tracto alimentar para outra, para um outro órgão oco ou para a pele. Essa perda de líquidos, eletrólitos e nutrientes, especialmente através das fístulas enterocutâneas, pode precipitar ou acentuar a desidratação, bem como alterar o balanço ácido-base e hidroeletrolítico, provocar desnutrição e vários problemas de pele e cicatrização de feridas. Subseqüentemente, as fístulas podem iniciar, agravar ou predispor os pacientes a hipovolemia, disritmia cardíaca, incompetência imune, pneumonia, sepse, insuficiência hepática, insuficiência renal, que podem provocar choque e morte. Até 1960 as taxas de mortalidade para pacientes com fistulas enterocutâneas eram de 40 a 65%¹.

Entretanto, em muitas instituições a mortalidade decresceu substancialmente durante as últimas 3 décadas (3 a 3,5%), como resultado do progresso no tratamento intensivo e técnicas intraoperatórias^{2,3}.

O tratamento conservador das fístulas enterocutâneas é preferível sempre que possível. O tratamento bem sucedido costuma ser muito oneroso e tem que seguir determinados princípios e prioridades: restaurar a volemia e o equilíbrio eletrolítico e ácido-base; controlar a infecção com antibióticos e drenagem de abscessos; iniciar regime de repouso do tracto alimentar, nenhum alimento pela boca, inibição da secreção gástrica, pancreática e intestinal, além da colocação de

sonda nasogástrica para aspirar suco gástrico; controlar o débito da fístula coletando e medindo a drenagem e protegendo a pele contra lesões; iniciar e manter nutrição através de nutrição parenteral, enteral (ou ambos). São medidas que devem ser iniciadas imediatamente após o diagnóstico e devem continuar de modo intensivo até que a fístula e as condições clínicas estejam controladas⁴.

A introdução da nutrição parenteral total e do tratamento intensivo em 1970 melhorou o índice de mortalidade, mas os pacientes ainda permaneciam nos hospitais por várias semanas ou meses, até a cura de suas fístulas. Assim sendo, um tratamento que possa diminuir o tempo de fechamento das fístulas seria altamente benéfico, podendo resultar em considerável diminuição dos custos hospitalares e do sofrimento para os doentes.

Em 1990 foi testado um modelo experimental para tratamento de fístulas enterocutâneas no Núcleo de Cirurgia Experimental-UFRN com o emprego de sonda balonada (Foley) para vedação do trajeto fistuloso, acoplada a frasco de vácuo de alta pressão, com os cães alimentando-se normalmente⁵ (Figura 4). O método já devidamente testado demonstrou não provocar lesão nos tecidos vizinhos à sonda e no intestino em estudo. Demonstrou ser viável, iniciando-se seu emprego em determinados casos bem definidos, com bons resultados iniciais. O estudo prosseguiu e, durante o período de 10 anos, 74 pacientes foram tratados pela técnica que foi proposta como tema para tese de doutorado no Programa de Pós-graduação em Ciências da Saúde.

Com base nestes aspectos, o presente trabalho consta da avaliação de tratamento conservador, previamente testado em trabalho experimental, em um grupo selecionado de pacientes portadores de fístulas enterocutâneas bem

definidas. Teve como objetivo observar a eficácia da conduta através da avaliação do tempo necessário para a cura das fistulas, complicações pós-operatórias, evolução nutricional e custo do tratamento.

2 REVISÃO DA LITERATURA

As fistulas enterocutâneas constituem uma complicação grave de doenças gastrointestinais e seus tratamentos, como a cirurgia. Embora elas possam ocorrer espontaneamente, a maioria delas (aproximadamente 80%) acontece após tratamento cirúrgico⁶. Desse modo, as causas mais freqüentes de fistulas enterocutâneas são lesão direta e inadvertida do intestino durante o ato operatório, deiscência de anastomoses ou o desenvolvimento de abscessos perianastomóticos. Causas menos comuns incluem trauma, isquemia, penetração direta ou necrose do intestino. Tumores malignos do intestino, doenças inflamatórias, corpos estranhos, infarto mesentérico e lesões por irradiação estão entre os fatores etiológicos de menor incidência^{7,8,9,10}.

O tipo de fístula também tem implicações clínicas importantes. Em uma fístula lateral, a continuidade do intestino é mantida, permitindo a progressão normal do conteúdo intestinal ao lado da fístula. Esse tipo é comum e costuma fechar espontaneamente se não estiver associada com outras anormalidades anatômicas. Nas fístulas terminais, ocorre a perda completa de continuidade intestinal e geralmente requer tratamento cirúrgico para seu fechamento. As complexas referem-se a múltiplas fístulas originárias de diversos órgãos (intestino, cólon, ductos biliares, pâncreas e outros) e constituem problema de solução altamente desafiador^{11,12}.

As causas predominantes de morte em pacientes com fístulas enterocutâneas têm sido má nutrição, desequilíbrio eletrolítico e sepse,

especialmente nas fístulas de alto débito do duodeno e jejuno proximal, que continuam a ser responsáveis por mortalidade elevada¹³.

As fístulas podem ser classificadas de acordo com o mecanismo etiológico de formação, da maneira como se observa na tabela 1.

Quadro 1 – Mecanismos etiológicos de formação das fístulas¹⁴

-
- 1- Anomalias do desenvolvimento embrionário
 - 2- Trauma penetrante direto com perfuração do intestino e estruturas adjacentes
 - 3- Aderências do intestino e vísceras adjacentes secundárias a inflamação, irradiação ou tumor, com conseqüente degeneração de suas paredes.
 - 4- Perfuração ou penetração dos órgãos ocos por tumor, trauma, inflamação, ou operação com abscesso localizado e subseqüente penetração do abscesso em órgãos vizinhos.
 - 5- Abscesso pós-operatório externo ao tracto gastrointestinal com penetração no intestino.
 - 6- Vazamento anastomótico secundário a erro técnico, tensão, isquemia, necrose e outros fatores.
-

Do ponto de vista fisiológico, uma fístula de alto débito é definida como aquela com perda de mais de 500ml de líquido por 24 horas. São uniformemente associadas com má nutrição grave. Fístulas de débito moderado têm perda líquida entre 200 e 500 ml por 24 horas e se acompanham de menor grau de má nutrição.

As fístulas de baixo débito resultam em pequena incidência de problemas nutricionais e caracterizam-se por perda líquida menor do que 200 ml¹⁵.

2.1 Fístulas pós-operatórias

Fatores locais e sistêmicos podem contribuir para a formação de fístulas pós-operatórias¹⁶, incluindo infecção ou deiscência de anastomoses devida a isquemia, tensão ou obstrução distal. Em geral as fístulas pós-operatórias são mais freqüentemente externas do que internas, em virtude da presença de drenos¹⁷. Operações para câncer, doença inflamatória intestinal e lise de aderências são as que apresentam o maior risco para causa de fístulas enterocutâneas³. Problemas técnicos que podem levar à formação de fístulas incluem lesão inadvertida de alças intestinais, retirada de serosa peritoneal visceral, defeitos de sutura e sutura provocando necrose isquêmica. Lesão de vasos mesentéricos, falhas na hemostasia resultando em hematomas compressivos, uso inapropriado de drenos e o englobamento de alças de intestino em sutura de parede abdominal¹⁷. Quando um abscesso está associado com uma fístula pós-operatória, o material infectado tende a coletar-se na vizinhança do defeito da alça afetada, comprometendo a cicatrização adequada do defeito fistuloso. Quando ocorre desnutrição, imunossupressão secundária ao uso de drogas, ou doenças concomitantes, a cicatrização torna-se ainda mais difícil¹⁸. As fístulas podem ocorrer em qualquer período do pós-operatório da cirurgia gastrointestinal. Entretanto, o tempo decorrido até seu aparecimento constitui um importante parâmetro para o tratamento e para o prognóstico. Fístulas precoces

que surgem nas primeiras 48 horas do pós-operatório podem ser consideradas como decorrentes de erro técnico e ocasionalmente, requerem intervenção cirúrgica igualmente precoce^{19,20}. Fístulas de baixo débito e bem drenadas, de aparecimento no pós-operatório tardio têm bom prognóstico e podem geralmente, ser tratadas de modo conservador. No entanto, em casos de fístulas tardias complexas de alto débito, a reoperação é necessária em um número considerável de casos na tentativa de fechamento e cura²¹. Com o grande aumento no número de operações laparoscópicas nos últimos 15 anos, lesões não reconhecidas do intestino provocadas pelos trocâteres ou por eletrocoagulação não percebida são causas potenciais de fístulas²². Para minimizar o risco de fístulas enterocutâneas pós-operatórias os seguintes princípios devem ser seguidos:

1. Maximização pré-operatória das condições nutricionais;
2. Administração de preparo intestinal e antibiótico profilático quando indicado;
3. Hemostasia perfeita e boa iluminação/visualização do campo operatório;
4. Uso de intestino sadio para realização de anastomoses sem tensão;
5. Visualização constante das vísceras gatrointestinais durante o fechamento da parede abdominal.

A localização anatômica das fístulas enterocutâneas auxilia na previsão de quais fístulas são de fechamento espontâneo favorável ou desfavorável. As características anatômicas desfavoráveis incluem abscesso adjacente, doença inflamatória intestinal, obstrução distal, trajeto fistuloso menor que 2 cm, defeito ou lesão intestinal maior que 1 cm, presença de corpo estranho, irradiação intestinal, epitelização do tracto fistuloso e presença de neoplasia. Quando a fistula localiza-

se no estômago, duodeno, jejuno proximal e íleo, o fechamento espontâneo é desfavorável⁶.



Figura 1 – Fístula enterocutânea de paciente submetido a enterectomia. Observa-se dreno tubular posicionado no orifício fistuloso.



Figura 2 – Fístula complexa com lesão de pele e deiscência de parede abdominal. Casos como este, foram excluídos da série tratada pelo método aqui descrito.

Na casuística analisada no presente estudo todas as fístulas ocorreram no pós-operatório e tinham como características: aparecimento tardio, presença de dreno prévio e evolução de pelo menos 7 a 10 dias até a instalação do tratamento proposto, como pode ser visto na figura 1. Fístulas como a observada na figura 2, complexa e acompanhada de lesões de pele, foram excluídas do trabalho.

2.2 Diagnóstico

O diagnóstico das fístulas enterocutâneas é relativamente fácil. A manifestação clínica inicial mais comum é a presença de íleo adinâmico e sepse de graus variados no pós-operatório. Em seguida, costuma ocorrer a drenagem de conteúdo entérico através de orifício de drenagem ou usualmente da ferida operatória, tanto espontaneamente, quanto após a abertura da parede abdominal. É freqüente acompanhar-se de febre, leucitose, dor abdominal e sinais de infecção da ferida operatória. Esses episódios ocorrem usualmente entre o 5º e o 10º dias do pós-operatório.

Estudos radiológicos como radiografia simples do abdome e tórax, exame contrastado do tracto gastrointestinal, fistulograma, ultra-sonografia e tomografia computadorizada auxiliam no diagnóstico, especialmente na localização anatômica, aspecto do trajeto fistuloso e complicações perifistulosas²³. Na figura 3 pode ser observada fístula duodenal diagnosticada através de seriografia esofagogastroduodenal, no pós-operatório de piloroplastia em paciente da casuística analisada no presente estudo.



Figura 3 – Seriografia esofagogastroduodenal de paciente submetido a piloroplastia. Observa-se extravasamento de contraste desde o bulbo duodenal (seta), em direção ascendente.

2.3 Tratamento

O elenco de condutas a serem efetuadas no tratamento das fístulas digestivas é dividido em três fases: 1) diagnóstico e reconhecimento; 2) estabilização e investigação e 3) cuidados definitivos. A meta principal na estabilização é o controle das complicações como anormalidades hidroeletrólíticas, desnutrição e sepse. Essas medidas devem ser sempre tomadas

nas primeiras 24 a 48 horas após o reconhecimento das fístulas e acrescidas das seguintes: 1- Nenhum alimento pela boca, assegurando repouso intestinal; 2- Colocação de sonda nasogástrica; 3- Uso de inibidor de receptores H₂ ou inibidor de bomba de próton; 4- Proteção da pele²⁴; 5- Drenagem cirúrgica ou percutânea de abscessos^{18,25}. 6- Correção de distúrbios nutricionais e hidroeletrólíticos²; 7- Administração de antibióticos de largo espectro.

Octreotida, um análogo da somatostatina, tem sido usado como adjuvante, pois reduz a secreção pancreática e de outros órgãos digestivos^{5,26}. Outras condutas terapêuticas para fístulas enterocutâneas têm sido utilizadas, como desvio do trânsito intestinal²⁷, uso de retalho do músculo reto abdominal²⁸, sistema a vácuo comercialmente disponível^{29,30} e vedação da fistula com cola de fibrina por via endoscópica³¹. Adicionalmente, a conduta instituída na casuística apresentada no presente estudo com vedação do trajeto fistuloso com sonda de Foley, aspiração com vácuo potente e dieta oral normal, representa uma alternativa a mais em casos de fístulas recentes e bem definidas. A figura 4 mostra a posição da sonda e seu balão em peça retirada de cão utilizado em estudo experimental que antecedeu o estudo aqui apresentado⁵.

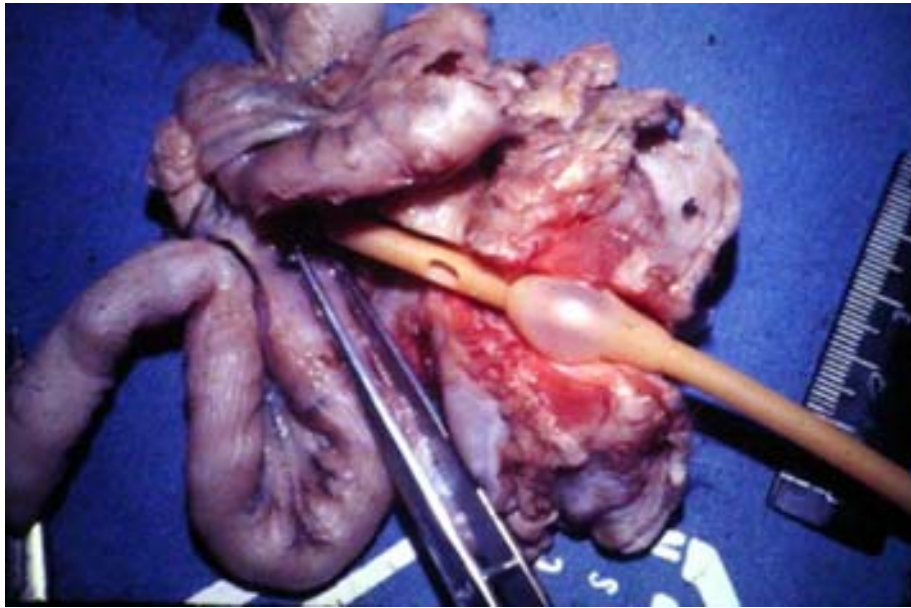


Figura 4 – Peça incluindo parede abdominal e alças jejunais do cão. O balão da sonda encontra-se na intimidade da parede abdominal, servindo de vedante da fístula. O vácuo aplicado provocou o colapso do trajeto fistuloso e fibrose⁵.

As fístulas enterocutâneas, quando ocorrem no pós-operatório, habitualmente representam um problema de difícil solução, seu tratamento é de alto custo e pode submeter os doentes a grande sofrimento. Há determinados tipos de fístulas pós-operatórias, como as analisadas no presente trabalho, que podem ser tratadas através de condutas conservadoras, porém com tempo de cura incerto, obrigando os doentes a permanecerem com dieta zero por via oral enquanto durar o tratamento.

Há alguns anos atrás, foi feito estudo experimental em cães no Núcleo de Cirurgia Experimental-UFRN, para testar modelo de tratamento de fístulas enterocutâneas provocadas em laboratório, publicado no *American Journal of Surgery*. O modelo mostrou-se eficaz e passou a ser utilizado nos doentes

portadores dessa complicação pós-peratória, internados no Hospital Universitário Onofre Lopes-UFRN. Como os resultados mostraram-se animadores desde o início da casuística e assim continuaram ao longo do tempo, surgiu a idéia e a motivação para prosseguir com o emprego do tratamento e utilizar os dados dele decorrentes para divulgação nacional sob a forma de tese de doutorado e internacional, através de publicação do trabalho em periódico internacional indexado (*Digestive Surgery*).

2.4 OBJETIVOS

Os objetivos do trabalho foram: avaliar a eficácia de tratamento conservador para fístulas enterocutâneas; comprovar que o sistema com emprego de balão vedante associado a vácuo de forte intensidade é viável e de fácil execução; observar se é possível tratar fístulas enterocutâneas sem perda de líquidos e usando dieta oral normal; calcular o custo do tratamento, tempo de cura e alta hospitalar.

3 ANEXAÇÃO DE ARTIGOS PUBLICADOS

3.1

(Trabalho publicado no periódico *Digestive Surgery* 2004;21:401-405).

Treatment of postoperative enterocutaneous fistulas by high-pressure vacuum with a normal oral diet

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ABSTRACT

Background/Aims: Enterocutaneous fistulas are associated with prolonged hospital stay, high morbidity/mortality, and increase in hospital costs. This study aims to describe the use of a vacuum system and normal oral diet in dealing with this problem. **Methods:** Seventy-four consecutive patients with recent and defined external postoperative fistulas were analyzed. Abdominal imaging was used to exclude abscess and distal obstruction. The fistula tract was sealed with Foley catheter, connected to a negative pressure flask, changed daily for 5, 10 or 15 days, as necessary. Normal oral diet was permitted. **Results:** No patient died. Serum albumin and transferrin showed significantly higher levels at the end of treatment than at the beginning. The moderate and low-output fistulas had the best results (97% closed). Forty-eight (65%) fistulas closed after five days, 16(22%) after 10 days and 4(5%) after 15 days. Treatment failed in 6(8%) patients, who subsequently underwent surgery. Only one patient with low-output did not close her fistula. The cost of the treatment was US\$ 41.75/day and it was considered cost effective. **Conclusions:** The vacuum system demonstrated good results in the treatment of fistulas. It included simplicity, low cost, short hospital stay, absence of skin breakdown, normal eating, good nutrition and activity patterns.

Keywords: Enterocutaneous fistula, Treatment, Vacuum system, Oral diet.

INTRODUCTION

Fistulas are abnormal communications linking two epithelized surfaces. The external digestive fistulas occur between a hollow organ and the outside body surface that permits the passage of fluids and secretions. These fistulas are catastrophic situations, occurring after an abdominal inflammatory disease, cancer, surgery and trauma. Their occurrence is associated with prolonged hospital stay, malnutrition, the need for one or more reoperations, and result in high level of morbidity and mortality, and increase in hospital costs. Despite the advances in nutritional support, patient monitoring, surgical intensive care, and improvement in surgical techniques, most series of fistulas still report mortality rates from 5.3%[1], 5.5%,[2], to 30.4%[3]. As hospital costs are a crucial problem, it is important to ask for a defined enterocutaneous fistula (ECF) treatment without expensive enteral or parenteral nutrition that requires a short hospital stay and permits essentially normal eating. In this study we present our experience with a simple method for treating patients with established ECFs using a high pressure vacuum with a balloon-tipped catheter to obturate the tract and a portable vacuum flask to keep it dry, as previously described[4].

METHODS

Over a 10-year period (1991-2000), we treated 74 consecutive patients with external post-operative digestive fistulas from whom data were collected prospectively and analyzed. They included patients whose fistulas had at least seven to ten days of duration, preferably using Penrose or tubular drains, so the fistulous tracts were at least 10 cm long. Gastric, enteric, colonic and biliary fistulas were included. Cervical, thoracic, esophageal, pancreatic, as well as fistulas in patients with infection, inflammatory disease, neoplastic tissue, or irradiation, were excluded. Abdominal imaging with computer tomography, ultrasound and fistulography were used to exclude clinically suspected intra-abdominal perifistulous abscess and to measure the length of the fistulous tract. Water-soluble contrast exams were performed in cases of questionable distal obstruction. The etiology of the fistulas is shown in Table 1. Fistula output was measured daily from three days before starting the treatment.

Table 1. Etiology of postoperative fistulas in 74 patients.

Etiology	Patients
Apendiceal stump leakage	18
Anastomotic leakage after small bowel resection	13
Anastomotic leakage after colon resection	11
Billroth II leakage	8
Choledocho-duodenostomy leakage	6
Billroth I leakage	5
Duodenal stump leakage	4
Choledochoplasty leakage	3

Enterotomy	3
Pyloroplasty leakage	2
Foreign body	1

Fistulas were considered as high-output with >500mL of fluid loss per 24 hours, moderate-output if fluid loss was 200 to 500mL/24 hours, and low-output fistulas with fluid loss <200mL per day.

The treatment has been previously described [4]. Briefly, the Penrose or tubular drain was removed, if present (Figure 1A), and a Foley catheter was positioned in the fistulous opening. The tip of the catheter remained in the tract, but well outside of the fistulized viscera (Figure 1B). The balloon was gently expanded with saline until the fistula tract was sealed. Vacuum was applied to the central lumen of the tube via a negative pressure flask (600mmHg), that was changed daily for 5 days, after which the Foley catheter was deflated and withdrawn.

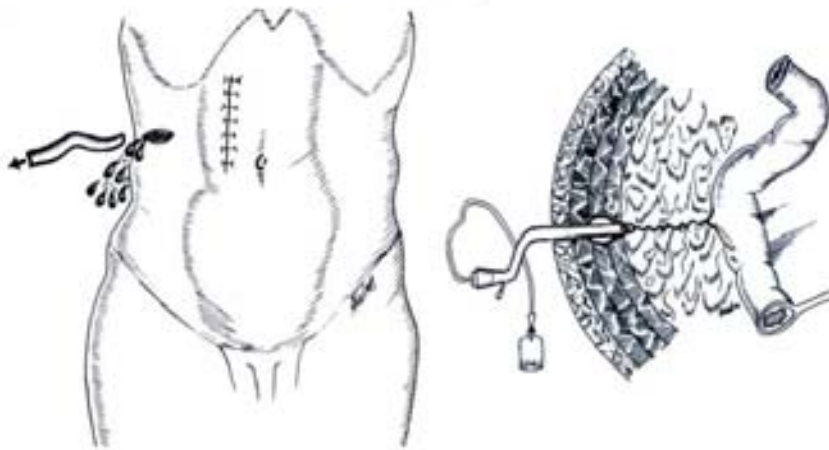


Figure 1. (A) After removal of the drain, the fistulous tract is established. (B) The device is installed with the tip of the Foley catheter outside the bowel wall. The balloon is inflated to seal the tract and keep the catheter in place. It is connected to the high-negative-pressure flask.

If the fistula was still open, the catheter was immediately reinserted and the vacuum was resumed for a second 5-day period. If necessary, a third 5-day suction was permitted. The patients were allowed a normal oral diet and deambulation. No drugs or parenteral or enteral diet was used. Serum albumin and transferrin were measured at the beginning of the treatment and when the fistulas were clinically considered closed. In this study we also evaluated the overall cost for one day of treatment using the suction system. It was calculated considering consumable items, staff costs, and daily hospital expenses (Brazilian Medical Association, 1996). The protocol and consent forms were approved by the Medical Ethics Committee of Federal University of Rio Grande Norte, Brazil.

Statistical analysis was performed using the Student *t*-test for paired data and the Fisher's exact test for comparison between proportions with respect to closure of fistulas. Differences were considered significant when $p < 0.05$.

RESULTS

Between the years 1991-2000, patients with ECFs were prospectively treated and analyzed. There were 74 patients (53 men and 21 women) aged 43 ± 18 . No patient died. As can be seen in Table 2, the serum albumin was predominantly 3.5g/dL or greater and no patient had it lower than 2.5g/dL.

Table 2. Association of two prognostic factors with the number of vacuum fistula closure and surgical closure: fistula output and initial serum albumin.

Fistula output	Vacuum closure	Surgical closure	Total
High-output	11	4*	15
Moderate-output	34	1	35
Low-output	23	1	24
Total	68	6	74
Initial serum albumin (g/dl)			
$\geq 3,5$	43**	2	45
3,5–2,5	25	4	29
$\leq 2,5$	0	0	0

*The proportion of surgical closure (failure of treatment) was significantly higher in high-output fistulas than in moderate and low-output fistulas ($p < 0.05$).

**The higher the serum albumin, the higher the proportion of cured patients with the vacuum system ($p < 0.05$).

Table 3. Visceral proteins at the beginning and at the end of treatment.

Proteins	Beginning of treatment	At closure of fistula
Albumin (g/dL)	3.1 ± 0.5	$3.3 \pm 0.5^*$
Transferrin (mg/dL)	197 ± 9	$204 \pm 11^*$

* $p < 0.05$ comparing with serum albumin and transferrin at the beginning of treatment.

Data are expressed as mean \pm standard deviation.

Table 4. Correlation between closure time and fistulas output.

Origin and output	n	5days	10days	15days	Not closure
High-output	n=15	8	3	0	4
Duodenal	4	1	1	-	2
Small bowel	9	6	2	-	1
Pyloroplasty	2	1	-	-	1
Moderate-output	n=35	22	8	4	1
Small bowel	7	4	2	1	-
Appendiceal leak	6	4	2	-	-

Billroth I – II	13	8	2	2	1
Choledocho-duodenostomy	6	4	1	1	-
Colon	3	2	1	-	-
Low-output	n=24	18	5	0	1
Appendiceal leak	12	9	3	-	-
Colon	8	7	1	-	-
Choledochus	3	2	1	-	-
Foreign body	1	-	-	-	1
Total	n=74	48*	16*	4*	6

*Significant differences were noted comparing the proportions of fistulas closed after 5, 10 and 15 days ($p < 0.05$).

There was significant difference between the mean serum albumin ($p < 0.05$) and transferrin ($p < 0.05$) when compared the beginning of the treatment and the closure of the fistulas (Table 3). Fifty-nine (80%) fistulas were classified as moderate to low-output, and they showed the best results with the treatment. The patients whose high-pressure vacuum treatment failed and required surgical closure were supplemented with enteral nutrition by jejunostomy. In all 74 cases there was a lateral fistula with the bowel in continuity. The majority of fistulas, 48 (65%) closed after five days, 16 (22%) after 10 days and 4 (5%) after 15 days. The difference among these proportions was significant ($p < 0.0001$). The treatment failed in 6 (8%) patients. Considering the 15 high-output fistulas, 4 (5%) of them did not close with the use of the vacuum system. Only 1 (1.3%) moderate-output fistula and 1 (1.3%) low-output fistula did not close (Table 4). The patient whose low-output fistula did not close after 15 days of treatment, had a cecal post appendectomy fistula. She was operated on and, as she had a foreign body (dressing) entering the cecum, was submitted to right colectomy and cured. Other surgical procedures included resection of fistula and reanastomosis in five patients. Seven patients with low-output fistulas were treated at homecare program and all had their fistulas closed in five days. The total cost of the treatment was US\$41.75/day and it was considered cost effective, when compared with the treatment of patients of the same hospital, including total parenteral nutrition (TPN), whose cost was US\$110.20/day (unpublished data).

DISCUSSION

The main goals in the management of ECFs are correcting fluid and electrolyte imbalances, minimizing malnutrition and controlling sepsis[5]. In our patients, abscess and wound infection were not found because all with sepsis were excluded. The 74 patients were managed by the same surgical team.

Most ECFs occur in the post-operative period (75-85%)[6]. Fistulas represent about 1-2% of complications after gastric or duodenal surgery and 1% of complications after jejunal or ileal surgery[7]. In the present study uncomplicated fistulas involving duodenum and small bowel anastomotic leakage occurred in 28 (38%) cases. The anastomotic etiology occurred in 43 (58%) patients,

corroborating with Nubiola et al [8], who had two-thirds of their patients developing anastomotic fistulas after small bowel resection.

Malnutrition did not occur in our patients because they did not lose protein-rich gastrointestinal secretions. Except during the few days before the beginning of the treatment, they had adequate nutrient intake by oral general diet, and they did not have sepsis or hypercatabolism. As a consequence, the serum albumin and transferrin had significant difference when comparing the beginning and the end of the treatment. No mortality was observed. Kuvshinoff et al found that transferring is of predictive value and related to spontaneous closure and influences mortality [9], results not confirmed in other studies [10]. The major morbidity and mortality from ECFs are related to fluid losses, electrolyte imbalances, malnutrition, and sepsis [11]. Since the advent of TPN the mortality of ECFs has decreased significantly. Early studies reported mortality up to 65% with high output fistulas, [12] although in most cases mortality ranged 6,5% to 37% [13,14,15,16]. The mortality is decreasing mainly because of advances in the care of the critically ill patients.

When the Foley catheter balloon was expanded, the fistula tract was sealed and the loss of gastrointestinal fluid immediately stopped. This fact was particularly relevant in the colonic fistulas, because our patients were treated in 10 bed wards so, the bad odor was definitively eliminated. The method described above was used according to pre-established criteria and cured 92% of the fistulas in a short period. The best result was observed after five days of treatment, when 48 (65%) patients had their fistulas closed. In previous experimental work in dogs, we showed that each of the fistulas that were clinically sealed using the same method were histologically closed and no damage was observed in the bowel [4]. In our hospital, patients whose enterocutaneous fistulas result in electrolyte imbalances, malnutrition, sepsis and other factors influencing the outcome of their fistulas, were treated with parenteral/enteral nutrition, octreotide [17]. In addition, all the priorities in the management recommended by Dudrick et al [5] were considered and implemented.

McIntyre et al related 114 patients requiring treatment for 132 fistulas. TPN was required in 48 cases, and the fistula closure rate for the entire series was 90.9%, with a mortality rate of 5.3% [1]. Another series of 108 patients having 114 fistulas of the GI tract were treated during a 5-year period [18]. Ninety-eight of the fistulas were treated successfully with a mean closure time of 30.9 days. Sixty-one percent of all fistulas closed spontaneously with TPN; 25% of the fistulas required surgical closure and the mortality was 10.5% [18]. In the present study, although the patients with infection, inflammatory disease, neoplasia or irradiation were excluded, selecting a group of patients likely to have a favorable outcome, they had rapid healing of the fistulae without the need of TPN and with low morbidity.

In times of budget constraints, it is essential to choose a treatment system of defined ECFs that is clinically effective and economically efficient. The lower hospital cost compared with TPN confirms that the vacuum system has advantages. A vacuum assisted closure system was used for chronic, sub-acute and acute non-healing wounds, as well as for ECF. Good results were reported in patients with complex moderate or high-output fistulas, which closed in three to five weeks, where conventional treatment had failed to prevent skin excoriation [19, 20]. Its objective is different from the method used in our patients. Some groups

have enjoyed success with the use of fibrin sealant to heal enterocutaneous fistulas that are resistant to nonoperative management, placing the fibrin percutaneously [21,22].

In conclusion, the vacuum system had good results and proved to be useful in the treatment of recent and well-defined fistulas. It included simplicity, low cost, short hospital stay, possibility of home care use, absence of skin breakdown, immediate cessation of bad odor in colon fistulas, and the opportunity of maintaining normal eating, good nutrition and activity patterns.

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Total gastrectomy with substitution of stomach by jejunal pouch with and without duodenal passage. Study in rats¹.

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Aires-Neto T, Cavalcante JF, Brandão-Neto J, Almeida MG, Rezende AA, Egito EST, Azevedo IM, Pinheiro LAM, Medeiros VB, Medeiros AC. Total gastrectomy with substitution of stomach by jejunal pouch with and without duodenal passage. Study in rats. *Acta Cir Bras* [serial on line] Available from: URL: <http://www.scielo.br/acb>.

ABSTRACT - Purpose: A comparison was done between the F. Paulino jejunal pouch (FP) and a jejunal pouch (JP) as esophagus-duodenum interpositional graft, for replacing the stomach after total gastrectomy. It was investigated the effect of the two procedures on esophagus histology, nutritional state and serum gastrin in rats. **Methods:** Male Wistar rats

weighing 282 ± 17 g were randomly submitted to sham operation (S), FP and JP after total gastrectomy. After eight weeks the rats were killed with overdose of anesthetic and tissue was taken from the distal esophagus for histology. Serum levels of total proteins, albumin, iron, transferrin, folate, cobalamine, calcium, as well as serum gastrin were determined. Survival was considered. **Results:** Forty six rats were operated and thirty survived for eight weeks. Five (33.3%) died after FP and 11 (52.3%) after JP ($p < 0.05$). Postoperative esophagitis occurred in 6 JP rats. At 8th week, no difference was observed on body weight when compared FP and JP rats ($p > 0.05$). The JP rats had a significant decrease in serum albumin, glucose, transferrin, iron, folate and calcium, compared to sham ($p < 0.05$). Serum gastrin, iron and calcium were significantly higher in JP rats than in FP rats ($p < 0.05$). In FP rats, transferrin and cobalamine showed significant decrease comparing the preoperative with 8th week levels ($p < 0.05$). **Conclusion:** F. Paulino pouch in rats had lower mortality than JP, and esophagitis was not detected in it. JP rats had serum gastrin, iron and calcium unaffected, possibly because of preservation of duodenal passage.

KEY WORDS – Total gastrectomy. Jejunal pouch. Nutrition. Gastrin. Reflux.

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Introduction

There are more than 50 described operations for intestinal reconstruction following total gastrectomy¹. However, the optimal reconstruction of the gastrointestinal tract following total gastrectomy has not been conclusively identified. Patient quality of life will be dependent on the severity of symptoms that develop postoperatively. The optimal reconstruction should be designed to function in a manner akin to the non-operated gut. The questions that have to be investigated are how to keep nutritional status, determine the benefit of preserving the duodenal food passage as well as the repercussion on the level of gastrinemia, in order to identify which procedures may be advantageous for patients. Clinical trials comparing various methods of intestinal reconstruction following total gastrectomy have been reported². Unfortunately, there has been no uniform operation performed and several different outcome variables have been compared. The search for a superior method of reconstruction has been hampered historically by the reliance on retrospective analyses of small groups of patients¹. Actually, there is no general agreement with regard to the ideal reconstruction type after total gastrectomy. The importance of the duodenal passage³, and the need for pouch reconstruction² have been studied.

The objective of the present study was to examine the benefits and technique of a distal isoperistaltic jejunojejunal stomach replacement pouch (Pernando Paulino pouch) versus interposition of jejunal pouch. Which technique offer the best preconditions related to the

importance of the duodenal passage and determine physiologic regulation of postoperative nutrition, mortality, reflux and serum gastrin in rats.

Methods

Male Wistar rats weighing 282 ± 17 g were used for experiments. Rats were housed under controlled conditions of illumination (12/12 hours light/dark cycle), humidity (60–70%), and temperature (21°C). The International guidelines for the care and use of laboratory animals were followed throughout the study.

Surgical Procedures

a) Sham: (S) Sham operation was performed by 3 cm midline laparotomy under ketamine hydrochloride (100 mg/kg) and xylazine (15 mg/kg) anesthesia. The stomach and the intestine were covered with saline-moistened gauze for 40 minutes, which corresponds to the time period required for the other surgical procedures.

b) Fernando Paulino jejunal pouch: (FP) The total gastrectomy was done and the jejunum was divided 10 cm distal to the ligament of Treitz⁸. The distal end of jejunum was anastomosed with the transected esophagus using single stitches (6-0 polipropilene). A jejunojejunal pouch was done, as seen in figure 1. The anastomosis were performed by using a (9x) binocular microscope (DF Vasconcelos®, Brazil).



Figure 1. Isoperistaltic Fernando Paulino pouch⁸.

c) Jejunal pouch interposition graft: (JP) After total gastrectomy the jejunum was divided 5 cm distal to the ligament of Treitz. The digestive reconstruction method included interposition of a jejunal pouch reservoir between the esophagus and duodenum, preserving the duodenal passage (Figure 2).

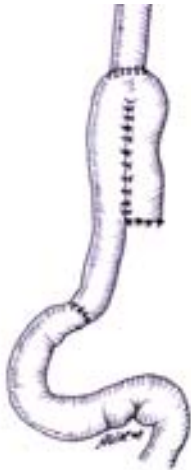


Figure 2. Jejunal pouch interposition graft.

After the operations the rats had an infusion of Ringer 10ml/Kg intraperitoneal and free access to oral glucose 10% was permitted. Rats resumed to normal diet on third postoperative day. If some animal died before the 60th postoperative day (8th week), it was substituted in order to complete 10 rats in each group and the mortality was computed. They were weighted on the same scale each two weeks. A recovery period of eight weeks was allowed for all operated animals before the following experiments were commenced.

Histological procedures

After eight weeks the rats were killed with overdose of anesthetic and tissue was taken from the distal esophagus (1 cm distant to the anastomosis) for investigation with regard to esophagitis. They were fixed in 10% formalin, embedded in paraffin, cut at 4 μ m, and stained with hematoxylin and eosin. The following parameters were considered: 1- loss of surface epithelium; 2- neutrophil infiltration; 3 - increased height of the basal cell layer of the squamous epithelium; 4 - increased depth of the papillae. Diagnosis of esophagitis was positive when 2 or more of these parameters were present. Duodenal mucosa was examined in regard to height of cripts, Brunner's glands and celularity.

Laboratory tests

Laboratory measurements were performed before and eight weeks after the operations. Serum levels of total proteins, albumin, iron, transferrin, folate, cobalamine, and calcium were determined with an autoanalyzer (Weiner Lab BT Plus 3000). Gastrinemia was measured by a double-antibody liquid phase radioimmunoassay.

Statistical analysis

Datas were analysed by one way variance ANOVA complemented with Newman-Keuls tests. Differences were considered significant at $p < 0.05$ in the two-tailed tests.

Results

Forty six rats were operated. Thirty survived for eight weeks. Five (33.3%) died soon in the postoperative period in the FP group, and 11 (52.3%) of group JP died before the fourth week (Table 1). The difference in mortality was significant ($p < 0.05$).

Postoperative esophagitis occurred in 6 survived rats of the group JP. Loss of surface epithelium, neutrophil infiltration and, increased depth of the papillae were found in 2 rats of this group. Increased height of the basal cell layer of the squamous epithelium and neutrophil infiltration were found in 4 rats. The FP rats had low increasing in height of the basal cell layer, and the sham rats had no signs of histological esophagitis. In group FP it was observed inflammatory reaction, atrophy of duodenal mucosa and, the JP rats showed no mucosal pathological signs.

Table 1 – Operative mortality

Groups	Operated rats (n)	Mortality n(%)	Survived after 8 weeks
FP	15	5 (33.3%)	10
JP	21	11(52.3%)*	10
Sham	10	0 (0.0%)	10
Total	46	16 (34.7%)	30

* $p < 0.05$ compared to FP group. Values are expressed as mean \pm SEM; FP, Fernando Paulino pouch; JP, jejunal pouch interposition graft.

The weight evolution showed a significant weight reduction on the first four weeks in group FP, and a partial weight gain until the 8th week. In JP rats the weight reduction occurred in course of the 5th week, and they stabilized in the 8th week (Figure 3).

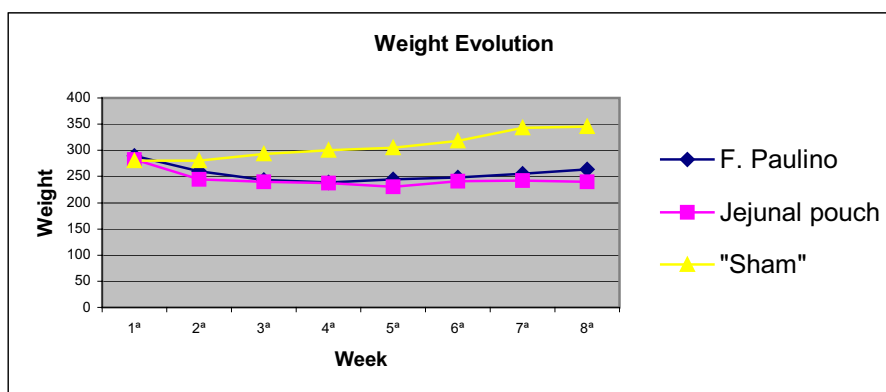


Figure 3 – Weight evolution of rats subjected to total gastrectomy and Fernando Paulino pouch, jejunal pouch and sham. No difference was observed between FP and JP groups ($p > 0.05$).

The JP interposition graft was associated with a significant decrease in serum albumin, glucose, transferrin, folate and cobalamine concentration in the 8th postoperative week, when compared to sham operated rats ($p < 0.05$); calcium and iron was unaffected (table 2). JP rats in the preoperative period, as compared to 8th week, displayed a significant decrease

in serum albumin, glucose, transferrin, folate and cobalamine ($p<0.05$). Glucose and cobalamine serum concentrations showed significantly reduced in FP rats when compared to S rats in 60th postoperative day ($p<0.05$). In FP rats, only transferrin showed significant decrease comparing the preoperative with 8th week postoperative levels ($p<0.05$). The serum gastrin levels showed significantly reduced in FP rats compared to JP and sham rats ($p<0.05$).

Table 2 – Laboratory findings at preoperative and eight weeks after operation.

Laboratory parameter	Group	Preoperative	8 th week
Albumin (g/dL)	Sham	3.6±0.5	3.8±0.3
	FP	3.4±0.2	3.1±0.2
	JP	3.4±0.4**	2.7±0.3*
Glucose (mg/dL)	Sham	102±13.1	99±6.3
	FP	96±10.3	86±23.7*
	JP	100±14.3**	80±12.1*
Transferrin (mg/dl)	Sham	236±20.4	229±24.1
	FP	224±22.8 [§]	160±15**
	JP	231±19**	163±21.3*
Iron (µg/dL)	Sham	288±13	286±22
	FP	277±12.6	223±14.1
	JP	268±12**	279±20.2*
Folate (ng/ml)	Sham	8.5±3.1	8.2±1.9
	FP	8.1±2.0	7.5±2.5
	JP	8.1±2.4**	7.2±0.7*
Cobalamine (pmol/L)	Sham	221±18	214±20.4
	FP	234±22 [§]	163±14*
	JP	219±23.2**	161±12.7*
Calcium (mg/dL)	Sham	8.4±0.5	9.7±1.8
	FP	9.1±0.8	6.6±3.3
	JP	8.9±1.6**	8.5±2.0*
Gastrin (pg/mL)	Sham	128.5±7.8	133.7±10.2
	FP	122.3±9.0**	17.4±3.1*
	JP	117.8±10.4**	86.4±8.2*, [§]

Values are expressed as means±SEM; FP, Fernando Paulino pouch; JP, jejunal pouch interposition graft.

* $p<0.05$ compared to sham 8th week; [§] $p<0.05$ compared to FP 8th week; ** $p<0.05$ compared to JP 8th week.

Discussion

It has been hypothesised that passage of food across the duodenum, resulting in the mixture of chyme with biliary and pancreatic secretions, aids in digestion, absorption, and the stimulation of the remaining intestinal tract^{4,5}. These processes should result in better calcium and iron absorption with improved lipid and protein digestion⁷. In fact, in the present study calcium and iron showed high serum levels when compared the pouch with duodenal passage with the F. Paulino pouch. The formation of an appropriate replacement gastric reservoir, to simulate pre-operative gastric volume, is considered important. Construction of an enteric pouch is thought to enable the patient to consume larger, more customary, and satisfying meals^{4,6}. A pouch should therefore improve the patients quality of life, allow them to ingest more calories, and help to prevent malabsorption and weight loss. Compared to sham, weight loss occurred in the two pouches tested in our study, and no difference was observed between them. Paulino and Roselli⁸ reported, in 1973, notably satisfying results in patients with a distal jejunojejunal pouch, tested in the present work. They described the use of either an isoperistaltic or antiperistaltic side-to-side attachment of the proximal afferent to the efferent jejunum, at the Roux-en-Y level, together with an end-to-end esophagojejunal anastomosis. The isoperistaltic technique was used in the present study.

The optimal reconstruction protocol after total gastrectomy is still a matter of debate. Given the decreasing morbidity and mortality rates after total gastrectomy^{9,10,17}, this issue is gaining even more importance. Pouch reconstructions are developed to create a larger reservoir with a better reflux barrier; of all, the reconstruction types without restoration of the duodenal passage, are used most often. An alternative is the interposition of a jejunal loop with reestablishment of the duodenal passage. Preservation of the duodenal passage should result in better physiologic enrichment of the chyme with bile and pancreatic juice and better physiologic regulation of gastrointestinal hormones, thereby offering substantial advantages⁴. The ideal reconstruction should supply the patient with a sufficiently large reservoir to accommodate more extensive meals. It should also act as a reflux barrier to avoid reflux esophagitis and should enable optimum utilization of the administered substrates. These practical demands are theoretically best served by the formation of a pouch with preservation of the duodenal passage, as that described by Nakayama¹⁶.

Advantages of pouch reconstructions^{9,10}, compared to the Roux-en-Y reconstruction and the advantages of restoration of the duodenal passage¹¹ have been repeatedly described, but definitive, statistically significant proof of the superiority of this method has not yet been presented in a prospective randomized study. Total gastrectomy patients suffer from a weight loss of 15% to 20%¹², which is less if the duodenal passage is preserved¹³. In the present work the levels of serum iron and calcium were preserved in the JP rats, the animals where the duodenal passage was preserved and the iron levels showed similar to the sham group. As the iron and calcium is absorbed in duodenum, possibly this physiologic characteristic possibly turned this fact possible. In present study no difference was observed in the weight loss when compared the tested reconstructions.

After total gastrectomy iron levels are low in up to 90% of patients¹⁴. Blood glucose regulation is disturbed after gastrectomy^{12,15}. Pathologic glucose tolerance develops if the duodenal passage is eliminated. Glucose was unaffected in FP and JP rats of the present study. Alkaline esophagitis occurs after any method of postgastrectomy reconstruction that allows reflux of bile and pancreatic secretions into the distal part of the esophagus. A Roux-

en-Y esophagojejunostomy eliminates esophagitis if the length of the jejunum, between the esophagealenteric and distal jejunojunal anastomoses, is at least 40 to 45 cm . In fact, in the present study F. Paulino procedure eliminated esophagitis, because the referred anastomosis was very distant to esophagus in our experiment.

The gastric antrum is the richest source of gastrin. It is secreted by G cells and has been localized by immunohistochemical technique¹⁸. The intestinal gastrin source is highest in the proximal duodenum and there is evidence for release of gastrin from it in response to a meal¹⁹. The total gastrin concentration is considerably less in duodenum than it is in the antrum, gradually decreasing toward the distal part of the small intestine²⁰. Our study showed that JP rats with duodenal food passage had serum gastrin higher than FP rats, and the duodenal mucosa was almost normal when compared to sham rats. In FP rats is was observed duodenal mucosal atrophy. Gastric mucosa from the parietal cell region of man and rats have been grown in tissue culture with and without the addition of pentagastrin, proving the trophical effects of gastrin²¹.

In conclusion, F. Paulino pouch in rats had lower mortality than JP, and esophagitis was not detected in it. JP rats had serum gastrin, iron and calcium unaffected, possibly because of preservation of duodenal passage.

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Aires-Neto T, Cavalcante JF, Brandão-Neto J, Almeida MG, Rezende AA, Egito EST, Azevedo IM, Pinheiro LAM, Medeiros VB, Medeiros AC. Gastrectomy total com substituição do estômago por bolsa jejunal com e sem passagem do alimento pelo duodeno. Estudo em ratos. *Acta Cir Bras* [serial on line] Available from: URL: <http://www.scielo.br/acb>.

RESUMO - Objetivo: Estudo comparativo foi realizado entre a bolsa jejunal de Fernando Paulino (FP) e uma bolsa jejunal (JP) interposta entre o esôfago e duodeno, para substituir o estômago após gastrectomia. Foi investigado o efeito dos dois procedimentos na histologia do esôfago, estado nutricional e gastrinemia sérica em ratos. **Métodos:** Quarenta e seis ratos Wistar pesando 282 ± 17 g foram aleatoriamente submetidos a *sham operation* (S), FP e JP após gastrectomia total. Decorridas 8 semanas, foi colhido sangue por punção cardíaca para dosagem de proteínas totais, albumina, ferro, transferrina, folato, cobalamina, cálcio, e gastrina. Os animais receberam dose letal de anestésico e tecido do esôfago terminal foi retirado para histologia. Foi observada a mortalidade operatória dos animais. **Resultados:** Quarenta e seis ratos foram operados e 30 sobreviveram por 8 semanas. Cinco (33,3 %) morreram após FP e 11 (52,3%) após JP ($p < 0.05$). Esofagite pós-operatória ocorreu em 6 ratos JP. Na 8ª semana o peso corporal foi maior nos ratos submetidos a FP do que JP ($p > 0.05$). Os ratos submetidos a JP tiveram uma diminuição significativa na albumina, glicose, transferrina, ferro, folato e cálcio, comparado com o *sham* ($p < 0.05$). Os níveis de gastrina sérica, ferro e cálcio mostraram-se significativamente

maiores nos ratos submetidos a JP do que nos FP ($p < 0.05$). Nos ratos FP a transferrina e a cobalamina estiveram significativamente diminuídas comparando-se os níveis do pré-operatório com a 8ª semana ($p < 0.05$). **Conclusão:** A bolsa jejunal de F. Paulino, em ratos, resultou em mortalidade operatória e incidência de esofagite de refluxo menor do que a interposição de JP. A JP não afetou a dosagem sérica de gastrina, ferro e cálcio, provavelmente devido à preservação da passagem dos alimentos pelo duodeno.
DESCRITORES: Gastrectomy total. Bolsa jejunal. Nutrição. Gastrina. Refluxo.

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4 COMENTÁRIOS, CRÍTICAS E CONCLUSÕES

Inicialmente, alguns comentários merecem ser destacados a respeito dos tipos de fistulas tratados no presente estudo. As fistulas gástricas são iatrogênicas em 85% dos casos, com as demais sendo devidas a outras causas^{32,33}.

O vazamento anastomótico após ressecção gástrica para câncer ocorre em 5 a 10% dos casos e muitos são devidos a câncer residual na linha de sutura. Assim sendo, dificilmente fecham e comportam uma mortalidade de 50 a 75%^{34,35,36,37}. Entre as 13 fistulas gástricas que foram tratadas na nossa casuística, todas elas eram de débito moderado, resultantes de gastrectomia prévia e dificilmente fechariam de modo espontâneo. Necessitariam seguramente dieta zero por via oral e alimentação parenteral ou enteral por sonda. Tiveram morbidez desprezível e apenas uma fístula gástrica não teve resultado satisfatório com o sistema a vácuo implantado.

As fistulas duodenais ocorrem mais freqüentemente como complicação da ressecção gástrica, da ressecção duodenal, dos procedimentos no tracto biliar³⁸, das ressecções pancreáticas e das operações no cólon direito em 85% dos casos^{39,40}. A mortalidade global para fistulas duodenais de todas as causas é de aproximadamente 30%. As que ocorrem no coto duodenal terminal fecham em cerca de 80% dos casos, enquanto que as fistulas laterais fecham espontaneamente em apenas 30 a 40% dos casos^{41,42,43}. Na casuística aqui analisada foram tratadas 12 fístulas envolvendo o duodeno, sendo metade delas de alto débito e a outra metade de débito moderado, como costuma ocorrer nesse tipo de fístula. Naquelas de alto débito o resultado satisfatório ocorreu em 50% dos casos, enquanto nas fístulas de débito moderado envolvendo duodeno

ocorreu o fechamento em 100%. Apesar dessas fístulas duodenais serem todas laterais, o tratamento conservador com dieta oral de rotina e vácuo teve êxito completo em 75% dos casos. A casuística aqui apresentada não pode ser comparável a séries de pacientes portadores de fístulas desde as mais simples às mais complexas. Apesar de ter como característica casos de fístulas recentes, de trajeto longo, com presença de dreno e sem abscessos perifistulosos, muitas delas dificilmente fechariam de modo espontâneo e necessitariam medidas terapêuticas mais onerosas, restrição alimentar e tratamento prolongado⁴⁴. A propósito, dos 74 pacientes tratados no presente estudo, 48 (65%) tiveram suas fístulas fechadas após cinco dias.

As complicações da cirurgia abdominal são a causa das fístulas do intestino delgado em 70 a 90% dos casos, que ocorrem mais freqüentemente por problemas técnicos durante o ato operatório. No que diz respeito às fístulas colônicas, elas são incomuns e na maioria das vezes, externas, causadas quase invariavelmente por uma complicação resultante de procedimento cirúrgico. Em uma série de pacientes com fístulas colocutâneas, 88 de 93 fístulas surgiram após procedimento cirúrgico⁴⁵. Das 30 fístulas de origem colônica da presente série, 22 (73,3%) fecharam após 5 dias de tratamento e 7 após 10 dias. Sabidamente, as fístulas do cólon são de baixo débito e curam espontaneamente na maioria dos casos^{46,47,48}. Partindo do princípio que os doentes foram tratados em enfermarias coletivas de 10 leitos, um dos méritos do tratamento instituído nas fístulas colônicas foi a eliminação imediata do mau odor resultante desse tipo de fístula após a vedação de seu trajeto fistuloso através do balão da sonda de Foley e vácuo de alta pressão.

Foi muito gratificante ter participado do estudo aqui relatado e ter introduzido método, previamente testado experimentalmente em laboratório da instituição, no tratamento de fístulas digestivas externas de pacientes do Hospital Universitário-UFRN. Pôde-se sentir a satisfação resultante dos bons resultados, nos pacientes tratados de complicação pós-operatória preocupante e algumas vezes debilitante. O término deste trabalho, despertou o interesse em continuar desenvolvendo estudos científicos nesta e em outras linhas de investigação da Base de Pesquisa em Cirurgia Experimental, contribuindo para o efeito multiplicador do conhecimento, promovido pela pós-graduação.

Em conclusão, os resultados obtidos no presente estudo permitem afirmar que o tratamento das fístulas enterocutâneas com uso de aspiração a vácuo de alta pressão, sob as condições de indicações estabelecidas no protocolo pré-determinado, apresentou bons resultados e comprovou ser útil no tratamento de fístulas recentes e bem definidas. O tratamento caracterizou-se por: facilidade de execução, baixo custo, curta hospitalização, possibilidade de tratamento domiciliar, ausência de lesões de pele, parada imediata de mau odor nas fístulas do cólon e a oportunidade dos pacientes manterem dieta oral normal, boa nutrição e atividades normais.

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6 ABSTRACT

Background/Aims: Enterocutaneous fistulas are associated with prolonged hospital stay, high morbidity/mortality, and increase in hospital costs. This study aims to describe the use of a vacuum system and normal oral diet in dealing with this problem. **Methods:** Seventy-four consecutive patients with recent and defined external postoperative fistulas were analyzed. Abdominal imaging was used to exclude abscess and distal obstruction. The fistula tract was sealed with Foley catheter, connected to a negative pressure flask, changed daily for 5, 10 or 15 days, as necessary. Normal oral diet was permitted. **Results:** No patient died. Serum albumin and transferrin showed significantly higher levels at the end of treatment than at the beginning. The moderate and low-output fistulas had the best results (97% closed). Forty-eight (65%) fistulas closed after five days, 16(22%) after 10 days and 4(5%) after 15 days. Treatment failed in 6(8%) patients, who subsequently underwent surgery. Only one patient with low-output did not close her fistula. The cost of the treatment was US\$ 41.75/day and it was considered cost effective. **Conclusions:** The vacuum system demonstrated good results in the treatment of fistulas. It included simplicity, low cost, short hospital stay, absence of skin breakdown, normal eating, good nutrition and activity patterns.

Keywords: Enterocutaneous fistula, Treatment, Vacuum system, Oral diet

