

# THE LEAKING OMENTAL PATCH PLACED FOR PERFORATED DUODENAL ULCER

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**19<sup>TH</sup> ANNUAL CONTROVERSIES AND PROBLEMS IN SURGERY**

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# THE LEAKING OMENTAL PATCH PLACED FOR PERFORATED DUODENAL ULCER

- Marked decrease in elective surgery for PUD
- Acute complications have remained quantitatively constant
- Perforated peptic ulcer affects 10% of PUD patients
- Omental patch standard treatment
- Little consistency on nomenclature of omental technique - omental plug (pedicle vs free) vs omentoplasty vs omentoplexy
- Generalised peritonitis following omental patch not widely reported
- Dominated by case series, retrospective studies & institutional bias

**Kumar K, Pai D, Srinivasan K, Jagdish S, Ananthakrishnan N.** Factors contributing to re-leak after surgical closure of perforated duodenal ulcer by Graham's Patch.

*Trop Gastroenterol.2002;23(4):190-2*

**Maghsoudi H, Ghaffari A.** Generalized peritonitis requiring re-operation after leakage of omental patch repair of perforated peptic ulcer.

*Saudi Gastroenterol 2011;17(2):124-8*

# OMENTAL PATCH CHALLENGES

## ❖ IS AN OMENTOPLASTY IS SUFFICIENT OR IS A DEFINITIVE ULCER OPERATION REQUIRED? #

- 1 Is the performance of an operation indicated?
- 2 **Is an omental “plication” sufficient or is a definitive ulcer operation indicated?**
- 3 Is the patient stable enough to undergo a definitive ulcer operation?
- 4 Which definitive ulcer operation is indicated?
- 5 Should the availability of newer medical options influence the choice of operation?
- 6 Should the procedure be performed laparoscopically or by laparotomy? \*

# Feliciano DV. Do perforated duodenal ulcers need an acid-decreasing surgical procedure now that omeprazole is available?

*Surg Clin North Am. 1992;72(2):369–80*

\* Lagoo S, McMahon RL et al. The Sixth Decision Regarding Perforated Duodenal Ulcer

*JSLs 2002; 6(4): 359– 68*

# OMENTOPLASTY OR OMENTAL PATCH: NECESSARY OR NOT?

## The history

- **Johan Mikulicz Radecki (1880)**

**1<sup>st</sup> surgeon who closed a perforated peptic ulcer (PPU) by simple closure:**

*“Every doctor, faced with a perforated duodenal ulcer of the stomach or intestine, must consider opening the abdomen, sewing up the hole, and averting a possible inflammation by careful cleansing of the abdominal cavity”*

- Excision of friable edges if indicated, the application of purse string sutures & omental graft on “top” - problem was narrowing of duodenum

- To avoid this, **Cellan – Jones (1929)** suggested a pedicle omentoplasty without primary closing of the defect

*“A rapid method of treatment in perforated duodenal ulcers” BMJ 15<sup>th</sup> June 1929*

- In 1937 **Roscoe Graham** published his results with a free omental graft

Surg Gynecol Obstet 1937:235–238

# THE OMENTUM: A UNIQUE ORGAN OF EXCEPTIONAL VERSATILITY

- protects the peritoneal cavity from infections by virtue of its "milky spots," which are collections of macrophages
- limits the spread of infections: *"The policeman of the abdomen"*  
Rutherford Morrison in the early 20th century
- potent lymphatics absorb enormous amounts of oedema fluids
- highly vascular organ with a rich source of angiogenic factors that promote the growth of blood vessels
- Source of various growth factors, neurotransmitters, neurotrophic factors & inflammatory mediators
- Contains omnipotent stem cells that can differentiate into a variety of cell types

**UNIQUE & PHYSIOLOGICALLY DYNAMIC TISSUE WITH IMMENSE THERAPEUTIC POTENTIAL**

# MORTALITY FOLLOWING PDU

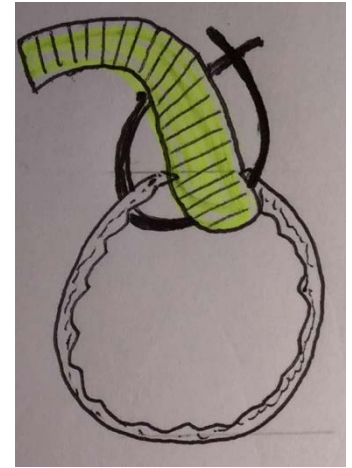
- ranges between 6.9 – 10% globally
- Risk factors consistently implicated in mortality following surgery for PDU include:
  - presence of shock at admission
  - coexistence of significant illnesses
  - age > 60 years
  - undertaking resection surgery
  - time delay between perforation and operation
  - preoperative blood urea and serum creatinine
  - size of perforation
- An important cause of mortality (up to 56%)\* is development of re-leak after PDU omental repair

\* Kumar et al Trop Gastroenterol 2002

# OMENTAL PATCH TECHNIQUES

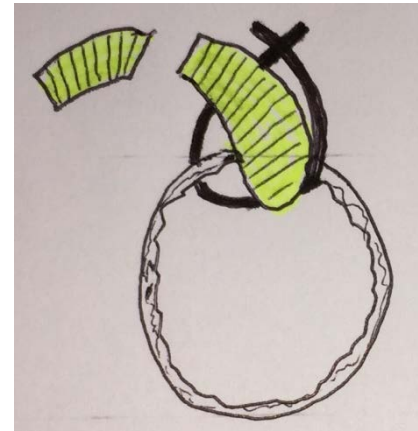
## ❖ Cellan-Jones (1929)

- The classic **pedicled** omental
- accepted as the gold standard treatment
- erroneously attributed to Graham (1937)



## ❖ Roscoe Graham (1937)

- use of a **free** graft of the omentum
- 3 sutures classically used with a piece of omentum graft laid over these sutures, which are then tied



**In both techniques, no attempt is made to actually close the perforation**

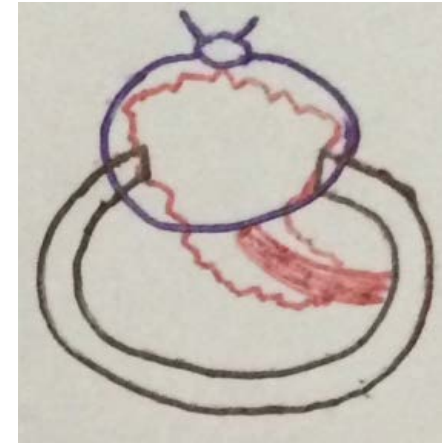
Cellan-Jones CJ. A rapid method of treatment in perforated duodenal ulcer. *BMJ* 1929(36): 1076-7

Graham RR. The treatment of perforated duodenal ulcers. *Surg Gynecol Obstet* 1937(64):235-8

# OMENTAL PATCH TECHNIQUES

## ❖ **Karanjia technique:** modified Cellan-Jones

- omental pedicle is secured to the tip of a NGT passed through the PDU.
- NGT withdrawn for 5-6 cms before the omentum is secured to healthy serosa

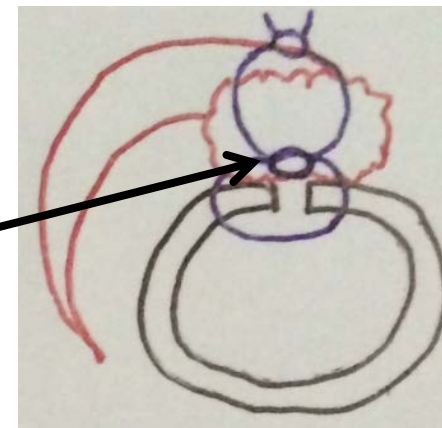


## ❖ **“Omentoplasty”** - on lay patch with pedicle

- Suture closure of ulcer – sutures not cut
- Segment of omentum secured on top of the closed perforation with same suture

### Concerns:

- Poor seal obtained when suture knots interposed between duodenal serosa and the omental patch
- The apposition of omentum is not as broad as with original described omental patch





# OMENTAL FREE GRAFT OR PEDICLE?

## Current evidence inconclusive- available results controversial

- post operative leak rates high as 12% in pedicled omental graft as compared to 0% in free omental graft

Jani K, Saxena V, Vaghasia R.

*Southern Medical Journal. 2006; 99(5):467-471*

- pedicled omental grafting is superior technique

Chaudhary A, Bose SM, Gupta NM, Wig JD, Khanna SK.

*Ind J Gastroenterol. 1991;10:14-5*

- free omental graft preferred rather than a pedicled graft

Sharma D, Saxena A, Rahman H, Raina VK, Kapoor JP

*Dig Surg 2000, 17:216-8*

**“..... mobilization of the omentum on its pedicle from the colon, and placement of sutures into the normal duodenum away from the perforation makes the performance of omental patch safe even in the presence of large sized perforations”.**

Gupta S et al. *BMC Surgery 2005; 5:15*

**WIDE, WELL VASCULARISED - TAKE CARE NOT TO STRANGLE OMENTUM**

# Re-leak following omentoplasty : the problem

- The rate of re-leak following omentoplasty reported to be between 2 – 7.6%
- The literature on this issue is sparse
- reliant on guidelines based on retrospective reports, personal experiences
- Kumar *et al* cited risk factors for re-leak following a “Graham patch” closure \*

- Age > 60 years
- Pulse rate > 110/minute
- Blood pressure <90mmHg
- Haemoglobin < 10g/dl
- Serum albumin <2.5 g/dl
- Total lymphocyte count < 1800 cells/mm<sup>3</sup>
- Size of perforation > 5mm

**\* No comment on state of omental patch at re-laparotomy**

- Kumar K, Pai D, Srinivasan K, Jagdish S, Ananthakrishnan N. Factors contributing to re-leak after surgical closure of perforated duodenal ulcer by Graham's Patch.

*Trop Gastroenterol.2002;23(4):190-2*

# Factors contributing to re-leak after surgical closure of perforated duodenal ulcer by Graham's Patch\*

- Haemoglobin level
  - Serum albumin
  - Size of PDU were
- } independent risk factors on multivariate analysis
- Low haemoglobin levels & serum albumin are well known factors influencing wound healing
  - correction of serum albumin is impractical
  - **PDU size & the omentoplasty technique deserve consideration**

## **Local factors<sup>#</sup>**

- aggravated by the high intraluminal pressures
- extrusion of the duodenal mucosa through the closure
- auto-digestion by the pancreatic enzymes and bile

\* Kumar K, Pai D, Srinivasan K, Jagdish S, Ananthakrishnan N. Factors contributing to re-leak after surgical closure of perforated duodenal ulcer by Graham's Patch. *Trop Gastroenterol.*2002;23(4):190-2.

# Walley BD, Goco I: Duodenal Patch Grafting. *Am J Surg* 1980, 140:706-8

# Omental patch challenges

## ❖ THE “GIANT” ULCER

- technically difficult to repair due to:
  - complex anatomy of the duodenum and
  - marginal blood supply shared with the pancreas
- several reports attest to the efficacy of omentoplasty in the management of a PDU up to a 3 cm diameter
- Schein’s comment that:

*“..do not stich the perforation but plug with viable omentum and patch a perforated ulcer if you can, if you cannot, then you must resect”* has wide currency

# THE MANAGEMENT OF LARGE PERFORATIONS OF DUODENAL ULCERS

	GROUP A (< 1cm)	GROUP B (1- 3 cm)	GROUP C (>3cm)
No of cases	122 (75%)	38 (23%)	2 (1.23%)
Average age	39	47	38
M:F	109:13	37:1	2:0
Ave duration symptoms	25 days	3.2 days	3.5 days
Surgery	Omental patch 119* Pyloroplasty 3	Omental patch 30 Jejunal serosal patch 4 Antrectomy 4	<b>Antrectomy 1</b> <b>Jejunal serosal patch 1</b>
Post-op leak	3 (2.7%)	5 (13%)	-
Morbidity	41	37	1
Post-op Hospital stay	7	14	6
Mortality	7 (6%)	6 (16%)	1 (50%)

\* 1 post-op leak

Gupta S, Kaushik R, Sharma R, Attri A. The management of large perforations of duodenal ulcers.

*BMC Surgery 2005; 5:15*

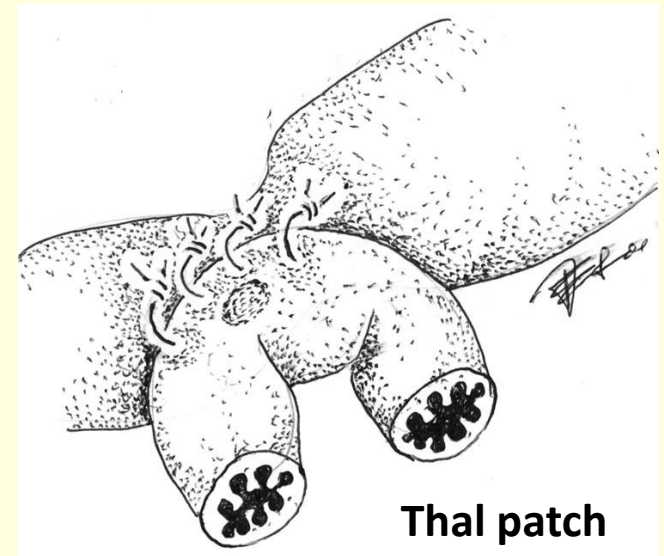
## Conclusions

3 distinct types of perforations

- “small” perforations: easy to manage, low morbidity & mortality
- “large’ perforations: not uncommon – omental patch gives best results
- “giant” perforations: extremely uncommon

## Options other than omentopexy/plasty

- jejunal serosal patch\*
- jejunal pedicled graft
- Tube intubation
- proximal gastroenterology
- gastric disconnection



- Kobold EE, Thal AP. A simple method for the management of experimental wounds of the duodenum. *Surg. Gynecol.Obstet* 11963;10:340-4

# MANAGEMENT OF RE-LEAK FOLLOWING OMENTOPLASTY

- **Recommendations based on**
  - stability of the patient
  - findings at re-laparotomy
  - available technical expertise
- **In both stable & unstable patients reinforcement of the original omentoplasty, if feasible**
- **Additional options for stable patient include**
  - wide drainage + feeding jejunostomy or a definitive procedure
- **Additional options for unstable patient include**
  - wide drainage + feeding jejunostomy **or**
  - pyloric exclusion with gastroenterostomy
- **If reinforcement of the original omentoplasty not feasible**
  - ulcer intubation
  - jejunal serosal patch

# Recent experience with management of re-leak following omentoplasty

17 (4%) patients with re-leak (422 patients with PPU between 1999 – 2006)

PATIENT DATA	< 1 cm	1 – 3 cm	1 <sup>st</sup> 24 hrs	> 24 hrs
Number	<b>10</b>	7	12	<b>5</b>
Average age	64	56	55	66
M:F	7:3	5:2	8:4	4:1
Duration of symptoms	2.5 days	1.6 days	-	-
Mortality	2 (20%)	3 (43%)	1 (9%)	<b>4 (80%)</b>
Post-op hospital stay	23 days	23 days	22 days	24 days



17 (4%) patients with re-leak (422 patients with PPU between 1999 –06)

## Pre-disposing factors

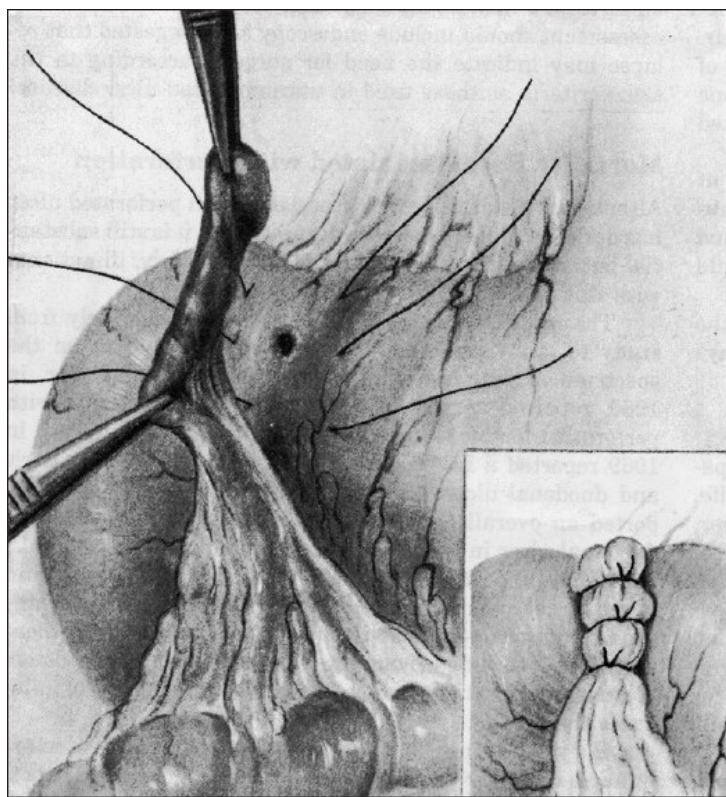
- Delay in surgery
- Shock on admission
- Post-op abdominal complications
- Age

} significant factors

**Patients with leaking omental “patch” = overall mortality 6/17 (59.4%)**

# Recent experience with management of re-leak following omentoplasty

17 (4%) patients with re-leak (422 patients with PPU between 1999 – 2006)



- all experienced generalized peritonitis after omental patch repair
- omental patch gangrenous appearance in 5 patients
- causes of omental patch leakage unknown in 12 patients
- partial or complete separation of omental patch in all patients

# Management of re-leak following “omentoplasmy”

## Generalized peritonitis requiring re-operation after leakage of omental patch repair of perforated peptic ulcer

- 17 /422 patients with re-leak
  - 13 patients: re-insertion of omental patch & sub-hepatic drainage
  - 3 patients: sub-hepatic drainage
  - 1 patient: jejunal serosal patch
- overall mortality was 59%

# Management of re-leak following “omentoplasty”

When reinforcement of original omentoplasty not feasible (friable, oedematous tissue, giant PDU, gross contamination), options include:

- intubation of the PDU with a feeding jejunostomy
- pyloric exclusion with gastroenterostomy
- definitive procedure
- rectus abdominis muscle flap\*

**Ultimately, the choice of procedure will depend on**

- operative findings
- available technical expertise
- the patient’s physiological reserve

**PRAGMATISM, RATHER THAN SURGICAL BRAVADO**

\* Agarwal P, Sharma D. *Ind J Surg* 2005; 67; 253-6

**PERFORATED DUODENAL ULCER**



**CELLAN-JONES/GRAHAM PATCH/OMENTOPEXY**



**RESUSCITATE PATIENT + RE-LOOK LAP/LAPAROSCOPY**



**RE-INFORCEMENT OF OMENTOPLASTY/PEXY \* + WIDE DRAINAGE + FEEDING JEJUNOSTOMY**



**STABLE PATIENT**



**UNSTABLE PATIENT**



**DEFINITIVE PROCEDURE**



- VAGOTOMY + GASTROENTEROSTOMY
- TRUNCAL VAGOTOMY + ANTRECTOMY
- PROXIMAL GASTRIC VAGOTOMY



**PYLORIC EXCLUSION WITH GASTROENTEROSTOMY**

\* Consider serosal patch or tube intubation + drainage

THANK YOU

**“PREVENTION IS NOT BETTER THAN CURE - IT THE BEST CURE”**

**Sachidananda Das**

