

When should we operate for recurrent diverticulitis

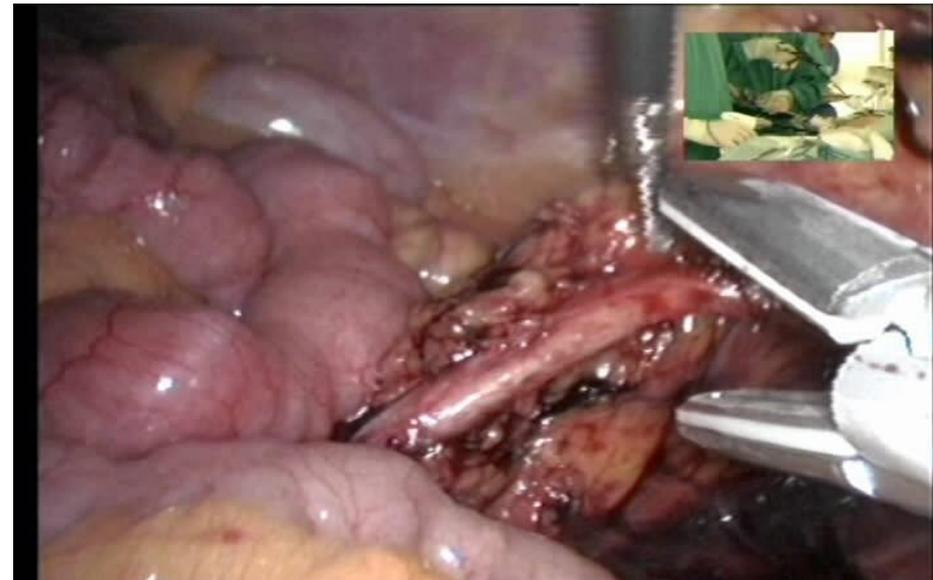
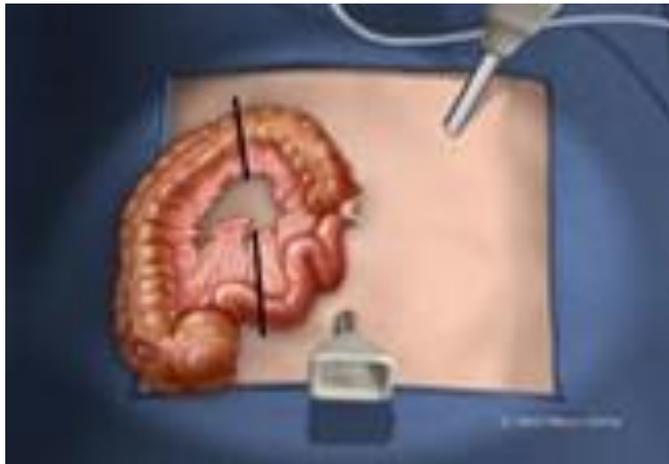
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KING'S HEALTH PARTNERS

Laparoscopic colorectal surgery

- Excellent results
- Relatively minimally invasive
- ...Anastomotic leaks & other complications



The decision to recommend elective sigmoid colectomy after recovery from uncomplicated acute diverticulitis should be individualized. Grade of Recommendation: Strong recommendation based on moderate-quality evidence, 1B.

Recommendation

The decision on elective resection should be made on an individual basis after the assessment of the particular circumstances of the patient (Grade C).

What is the incidence of recurrent diverticulitis?

- Muller 2005: 252 pts, 7 years follow-up
 - 34% recurrence of symptoms, 10% had surgery
- Nelson 2008: 99 pts complicated diverticulitis
 - Managed conservatively
 - 46/99 had recurrence
 - 20/46 had surgery for recurrent symptoms
 - No emergency surgery

Can localized perforation predict?

Poletti PA, AJR 2004

168 patients, 18 months fup

32% recurrence of diverticulitis

CT scan with abscess or pockets of gas > 5 mm was predictor of recurrence

Long-term follow-up after an initial episode of diverticulitis: what are the predictors of recurrence?

Hall JF Dis Colon Rectum. 2011

- 672 pts, first attack diverticulitis
- Mean follow up 42 months
- Sigmoid 72%, descending 33%, right 5%
- Recurrence at 5 years 36%
 - Medical management
- **Complicated recurrence 3.9%**
 - Surgical management**
- Higher Risk
 - Family History - OR=2.2
 - Length of involved colon > 5 cm OR = 1.7
 - Retroperitoneal abscess – OR = 4.5
- Right colon no recurrence OR= 0.27

Patterns of recurrence in patients with acute diverticulitis. Eglinton Br J Surg. 2010

- 502 pts
 - 337 uncomplicated >
 - One recurrence 18.8%
 - Two+ recurrences 4.7%
 - 5% developed complications
 - 165 complicated >
 - Recurrence in 24% within 12 months
- Recurrence is
 - Low
 - Early
 - “Failure to settle” of initial episode

- 25,000 hospitalized pts
- 19% recurrence
- 5.5% emergency colectomy or colostomy
- Younger pts < 55 more likely HR= 1.39
- HR was 2.2 for each subsequent admission
- Younger pts with multiple admissions more likely to have surgery

- 2551 pts with medical management
- Mean follow-up 8.9 years
- 13.3% recurrence
- **Younger age** or **previous recurrence** were the only factors predictive of recurrence
- There was **no need for elective colectomy** at follow-up

The Numbers challenge the Myths

- Estimated that after acute diverticulitis 1/2000 patient-years of follow up required for **one emergency stoma**
Janes 2005
- **18** pts need to undergo elective colectomy **to prevent 1** emergency colectomy
Anaya 2005
- Complicated disease tends to present on **first attack**
Chapman 2005
- Surgery after 4th attack **same risk** for colostomy as 1st
Salem 2007
- Increase in admissions > decrease in colectomy > **increase in abscess drainage** > decrease in emergency stoma
Ricciardi 2009

Risk Factors for Diverticulitis

- Females/ Males 3/2

Chalmers 1983

- Younger age

Acosta 1992

Spivak 1997

- Obesity

Bailey 2013

- Smoking

Papagrigoriadis 1999

- Connective Tissue Disorders

- NSAIDS

- Steroids

Kvasnovsky 2015

Young patients

- Long standing claims that diverticular disease more virulent in the young
- **Meta-analysis of 12 studies - 4982 patients**
- Selected age cut off 40-50 only studies using CT scan
- Primary outcomes
 - Hospitalization
 - Recurrence
- **Males RR 1.7**
- No more complicated disease
- No difference in surgery at 1st hospitalization
- No mortality
- Higher recurrence rate than older patients **RR 1.7**

Diverticular perforation and medication –Kvasnovsky 2015

Medication type, Study

NSAIDs

| | |
|----------|---------------------|
| Corder | 0.24 (0.03, 1.54) |
| de Boer | 5.79 (1.78, 21.82) |
| Goh | 7.10 (2.48, 19.58) |
| Morris | 3.76 (1.99, 7.15) |
| Mpofu | 2.12 (1.16, 3.82) |
| Piekarek | 3.10 (1.27, 7.36) |
| Wilson | 10.49 (3.34, 33.98) |

Overall effect 3.40 (1.84, 6.31)

Heterogeneity: $\chi^2 = 15.16$ df =1, P < 0.01, I² = 72.7%

Aspirin

| | |
|----------|-------------------|
| Humes | 1.38 (0.84, 2.18) |
| Morris | 0.85 (0.43, 1.63) |
| Piekarek | 0.72 (0.28, 1.65) |

Overall effect 1.03 (0.69, 1.55)

Heterogeneity: $\chi^2 = 0.02$ df =1, P = 0.88, I² = 27.9%

Corticosteroids

| | |
|----------|----------------------|
| Corder | 16.00 (2.42, 671.70) |
| Humes | 3.07 (1.76, 5.16) |
| Morris | 6.44 (2.32, 20.41) |
| Mpofu | 29.44 (5.95, 279.6) |
| Piekarek | 18.10 (3.52, 174.99) |

Overall effect 9.08 (3.49, 23.62)

Heterogeneity: $\chi^2 = 20.42$ df =1, P < 0.01, I² = 70.6%

Opioids

| | |
|----------|--------------------|
| Humes | 2.72 (1.98, 3.69) |
| Morris | 1.79 (1.02, 3.10) |
| Piekarek | 4.00 (1.45, 10.86) |

Overall effect 2.52 (1.77, 3.57)

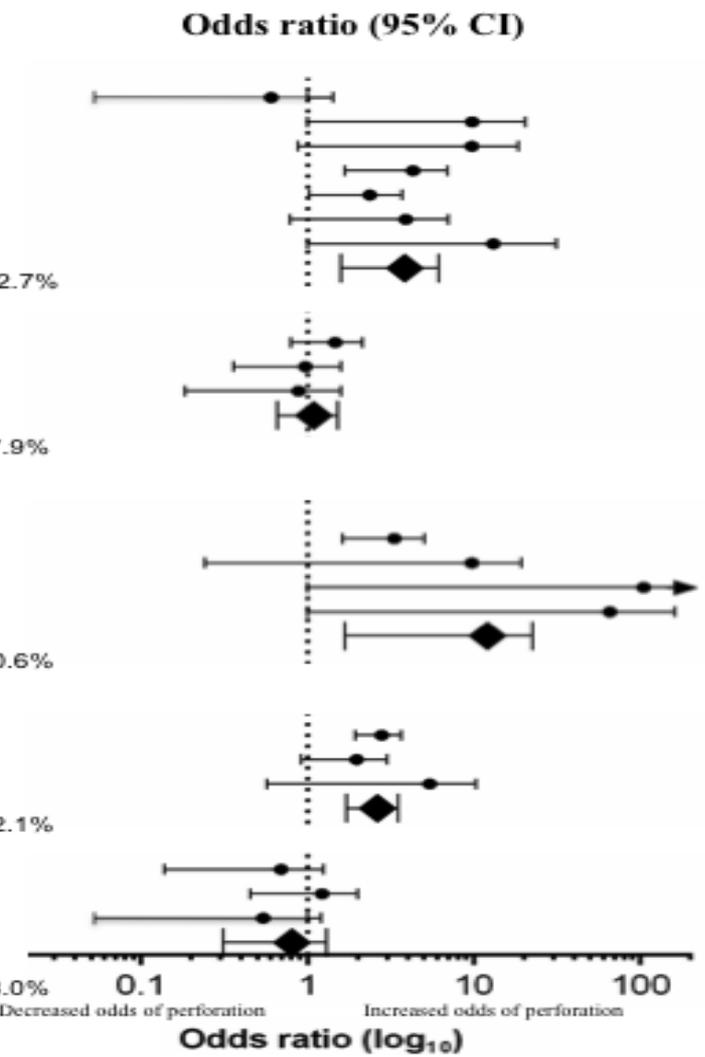
Heterogeneity: $\chi^2 = 26.65$ df =1, P < 0.01, I² = 32.1%

Calcium channel blockers

| | |
|----------|-------------------|
| Humes | 0.57 (0.21, 1.30) |
| Morris | 1.07 (0.54, 2.06) |
| Piekarek | 0.30 (0.03, 1.29) |

Overall effect 0.70 (0.37, 1.34)

Heterogeneity: $\chi^2 = 1.17$ df =1, P = 0.28, I² = 38.0%



Diverticular bleeding and medications –Kvasnovsky 2015

Medication type, Study

NSAIDs

| | |
|--|--------------------------|
| Lee | 1.35 (0.46, 3.83) |
| Niikura | 2.65 (0.97, 8.79) |
| Okamoto | 3.61 (1.19, 11.55) |
| Suh | 3.19 (0.78, 11.40) |
| Suzuki | 1.18 (0.33, 4.41) |
| Tsuruoka | 12.20 (2.40, 117.17) |
| Wilson | 1.76 (0.39, 7.61) |
| Yamada | 8.14 (1.43, 82.43) |
| Overall effect | 2.69 (1.65, 4.40) |
| Heterogeneity: $\chi^2 = 15.57$, $df = 7$, $P < 0.01$, $I^2 = 32.5\%$ | |

ASA

| | |
|--|--------------------------|
| Jansen | 1.14 (0.41, 2.97) |
| Suh | 5.98 (2.58, 13.88) |
| Suzuki | 4.50 (1.92, 11.36) |
| Yamada | 3.29 (1.14, 9.70) |
| Overall effect | 3.24 (1.59, 6.59) |
| Heterogeneity: $\chi^2 = 10.55$, $df = 1$, $P < 0.01$, $I^2 = 64.1\%$ | |

Warfarin

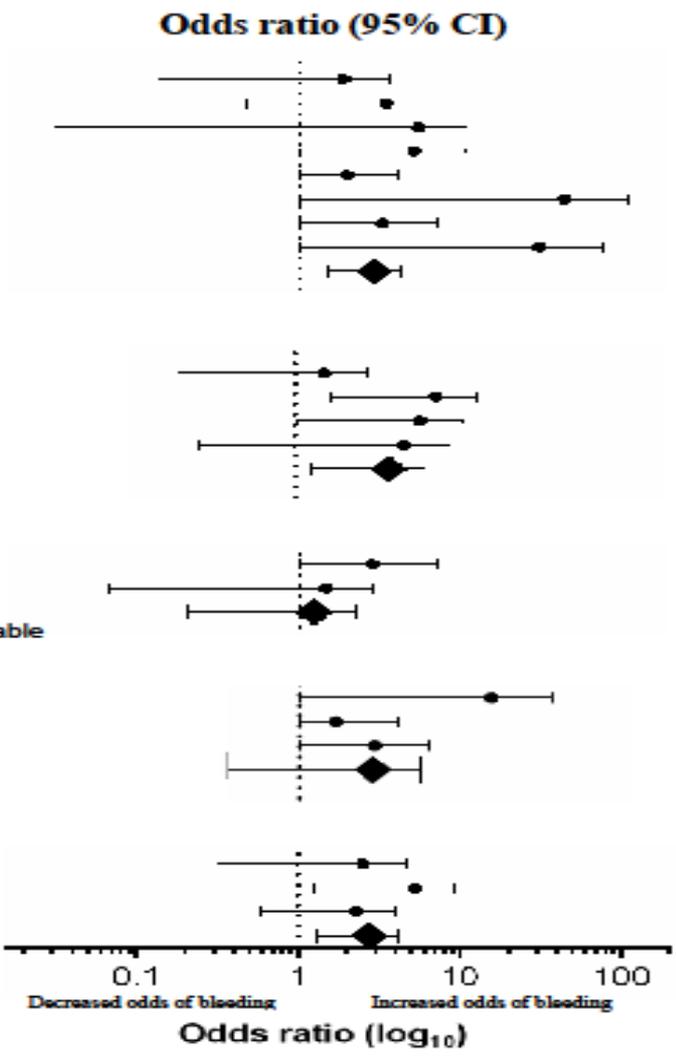
| | |
|--|--------------------------|
| Suh | 0.56 (0.0, 7.95) |
| Suzuki | 1.00 (0.34, 2.98) |
| Overall effect | 0.94 (0.38, 2.37) |
| Heterogeneity: $\chi^2 = 0.01$, $df = 1$, $P = 0.90$, $I^2 = \text{not calculable}$ | |

Corticosteroids

| | |
|---|--------------------------|
| Jansen | 5.49 (0.86, 39.13) |
| Niikura | 0.57 (0.01, 4.45) |
| Suzuki | 1.65 (0.46, 6.64) |
| Overall effect | 1.95 (0.64, 5.93) |
| Heterogeneity: $\chi^2 = 1.37$, $df = 1$, $P = 0.24$, $I^2 = 36.2\%$ | |

Calcium channel blockers

| | |
|--|--------------------------|
| Jansen | 1.89 (0.69, 4.94) |
| Suh | 4.26 (1.86, 9.72) |
| Yamada | 1.86 (0.83, 4.15) |
| Overall effect | 2.50 (1.44, 4.35) |
| Heterogeneity: $\chi^2 = 10.65$, $df = 1$, $P < 0.01$, $I^2 = 31.4\%$ | |



Special groups for surgery

- **Post hysterectomy** patients with recurrent diverticulitis admissions > increased pelvic **fistulas**

Altman 2010

- **Immunosuppressed**, on chronic **steroids**, **transplant** pts > high mortality on medical therapy > should be offered elective surgery after 1st attack

Hwang 2010

- Proposed: “Patients who are planned for transplant and have history of acute

Smoldering?

- “Smoldering” diverticulitis – persistent atypical symptoms
- Mayo Clinic term 2001
- 47 cases (5% of total)
- Elective colectomy
- 76% of specimens contained inflammation
- 12 months follow-up
- 76.5 (!) % of pts relieved of symptoms
- Should we rely on inflammation markers?

Horgan 2001

Uncomplicated diverticulitis, more complicated than we thought.

- 684 “uncomplicated” diverticulitis pts (Mayo)
 - **564 (82%) “Acute Resolving”**
 - 30 d complications 35%
 - Symptom resolution > 99%
 - **66 (9.6%) “Smoldering”**
 - 30 d complications 22%
 - Symptom resolution 89%
 - **54 (7.9%) “Atypical”**
 - 30 d complications 26%
 - Symptom resolution 93%

- Research clinic
- Study on 177 patients' symptoms and clinical course
- Median follow up 15 months -4 appointments
- 95 (53%) had persistent symptoms (>3 months)
- Patients with > 2 episodes more likely persistent symptoms (p 0.0001)
- Younger patients more likely persistent symptoms OR 3.98 (p 0.04)
- Only 12 patients (6.9%) had elective surgery

Kvasnovsky 2015

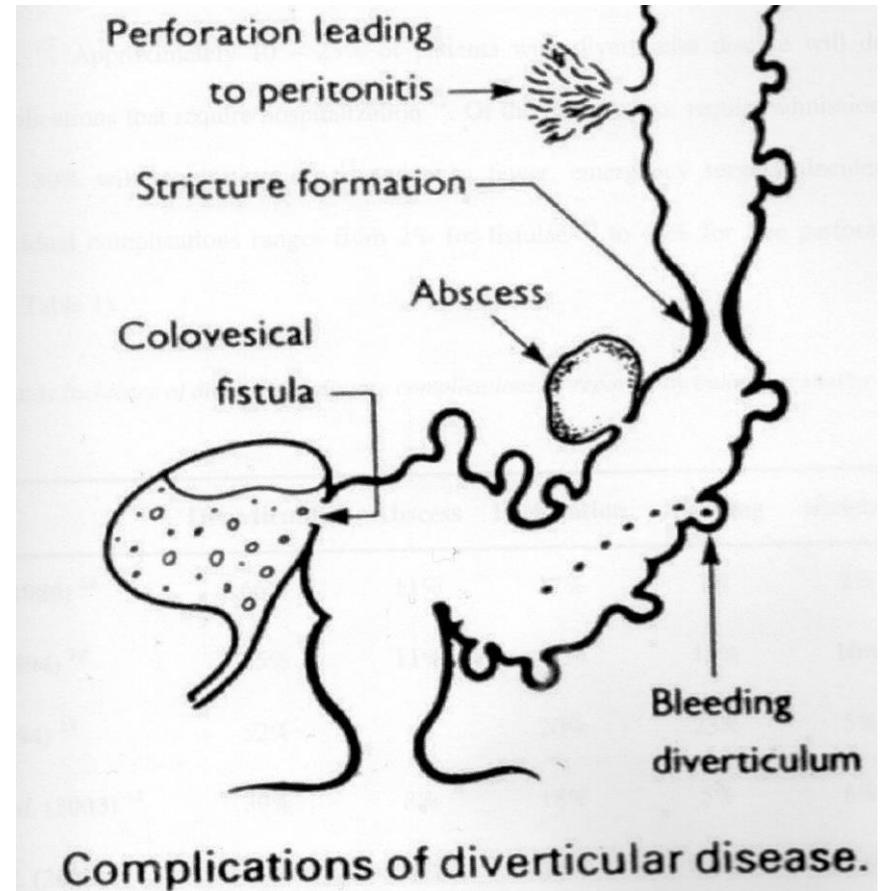
Chronic symptoms not related to inflammation

- **Persistent symptoms** were correlated with **lower initial CRP**
- More intense initial inflammation makes symptoms more likely to settle
- **Less intense initial inflammation** makes more likely to develop **persistent symptoms**

| | OR estimate, 95% CI | P value |
|----------------------|----------------------------|----------------|
| Male gender | 0.34 (0.10-1.12) | 0.07 |
| Age <50 at diagnosis | 3.98 (1.09-14.51) | 0.04 |
| Hinchey III or IV | 0.58 (0.18-1.87) | 0.36 |
| Peak CRP < 50 | 3.62 (1.10 -11.92) | 0.03 |

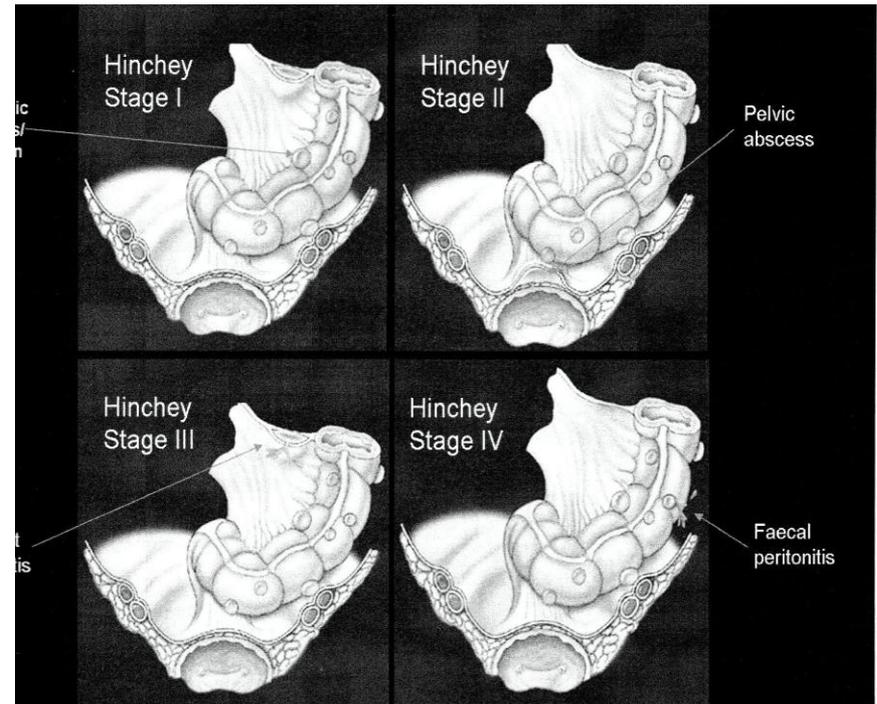
Surgery for complications

- Free Perforation
- Abscess
- Colovesical Fistula
- Bleeding
- Colovaginal Fistula
- Stricture



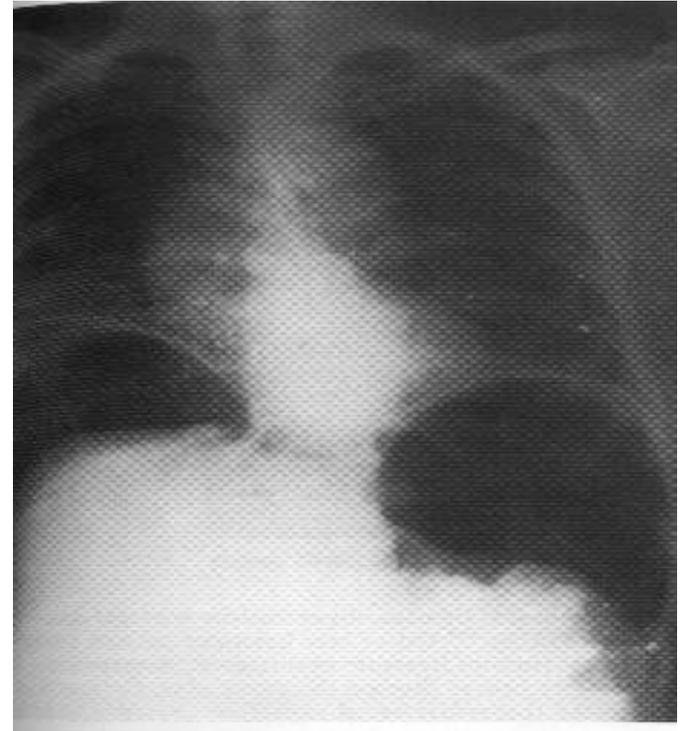
Hinchey Classification

Hinchey classification attempts to quantify the degree of sepsis according to pathological stage of the complicated diverticulitis.



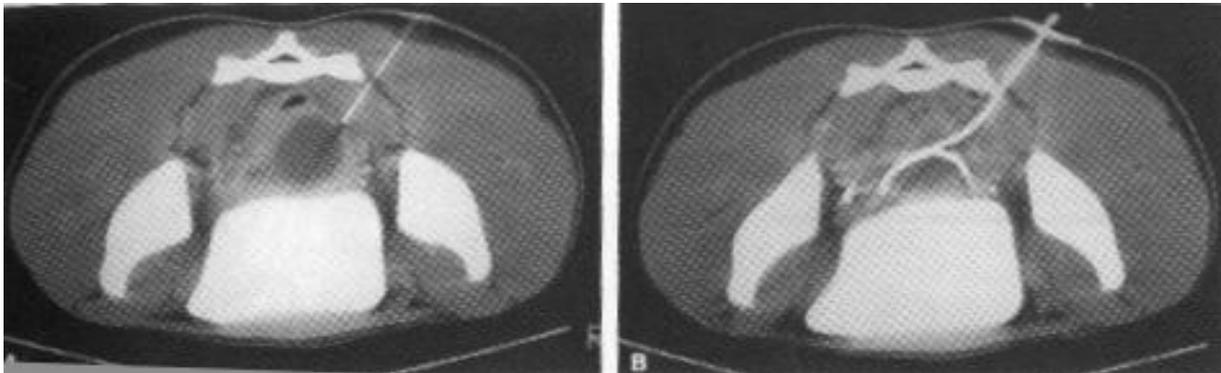
Complications: Free perforation

- Generalized peritonitis - septicaemia
- Free gas in the abdomen
- Pneumoperitoneum - abdominal distention
- Treatment: Urgent laparotomy
- High mortality



Complications: Phlegmon or Abscess

- Most common complication
- Localized peritonitis of left iliac fossa
- Antibiotics 90% successful if < 2 cm
- Percutaneous aspiration of abscess under CT guidance
- Colectomy should be considered if > 5 cm (claims of up to 40% recurrence) – *Kaiser 2005*



Complications: Colovesical fistula

- Pneumaturia
- Fecaluria, haematuria, frequency
- 25% fever and abdominal pain
- Sepsis
- Diagnosis with CT scan, cystoscopy -sigmoidoscopy
- Colectomy (1 or 2 stage) has good results

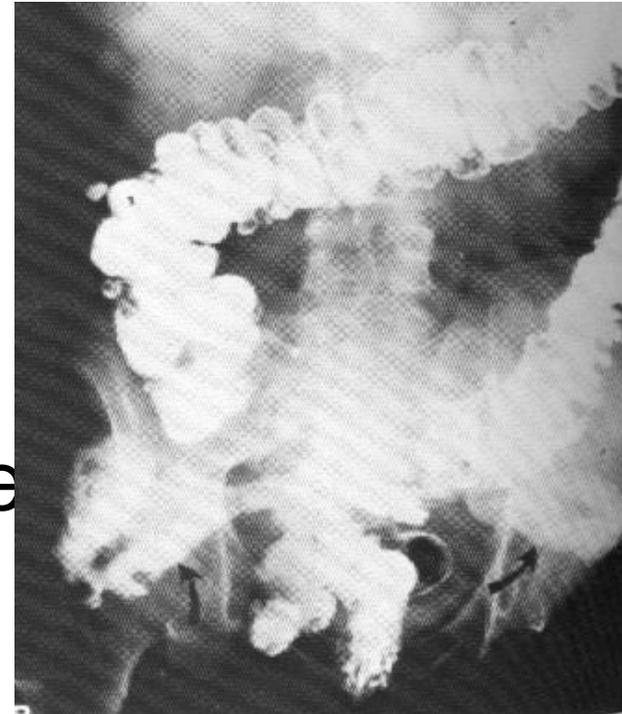


Complications: Colovaginal fistula

- It rarely occurs if the uterus is present
- Vaginal discharge of feces, blood, gas
- Colposcopy and sigmoidoscopy put the diagnosis
- One stage resection of the fistula

Complications: Thigh abscess

- Suspected if enteric organisms are isolated
- Retroperitoneal perforation
- Neurovascular bundles that penetrate the abdominal wall
- Inguinal rings
- Through the pelvic floor



Complications: Bleeding

- Common
- Usually acute massive rather than chronic bleeding
- Some authors believe it is overdiagnosed as often the cause is arteriovenous malformation
- Urgent colonoscopy or Angiogram
- Subtotal colectomy

Bleeding differs in epidemiology

- National USA data 2000-2010
- Admissions for diverticulitis increased & peaked in 2008
 - Higher prevalence in
 - Women
 - whites
- Admissions for bleeding decreased constantly
 - Equal in men/ women
 - More in blacks

Wheat & Strate 2015

Natural history of bleeding

- 1514 asymptomatic diverticulosis on colonoscopy (Japan)
- 2001-2013
- Median follow up 46 months
- 35 haemorrhages
- Median time-to-bleeding 50 months
- Bilateral diverticulosis > higher bleeding risk
- Cumulative incidence of bleeding
 - 0.2% @ 12 months
 - 2.2% @ 60 months
 - 9.5%% @120 months

Risk of recurrent bleeding

- 78 haemorrhages
- 57 months median follow-up
- 47% repeat haemorrhage at a mean 8.1 months
- 80% of bleedings were from the left colon
- 97% of recurrent haemorrhage had surgery
- Risk factors for re-bleed
 - Diverticulitis
 - Peripheral vascular disease
 - Renal disease

Aytac 2014

- 123 hemorrhages
- Overall follow – up 8 years
- Overall recurrence 13.8%

Poncet 2010

When should we operate

- Only a small number of diverticular disease patients will require **elective surgery**
- There is no sufficient justification that **young patients** suffer more complications, although they have **more recurrences** and may suffer more **chronic** symptoms
- There is a group of patients with **chronic symptoms which are not related to inflammation**
- Chronic symptoms may relate to **disturbance of neural sensory pathways** similar to those affected in Irritable Bowel Syndrome
- We should operate on complications if not radiologically manageable
- We cannot operate on the grounds of risk factors....
- ...with the EXCEPTIONS of
 - Bleeding complications
 - Immunosuppressed patients
 - Recurrent episodes in females with hysterectomy

When should we operate

- Not possible any more to give broad prescriptions for surgery applicable to many
- Decision for surgery should be individualized on the grounds of
 - Risk factors
 - Severity of symptoms & history
 - Patient fitness and operative risk
 - Patient individual risk factors

Thank you

