WHAT TO DO WITH INCIDENTAL FINDINGS DURING COLORECTAL SURGERY

Kaiser Permanente

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MAYO CLINIC
ROCHESTER, MN
INCIDENTAL SURGERY

1. Is it Safe?
2. Will it prevent future problems?
INCIDENTAL SURGERY (IS)

3600 consecutive colonic resections 1974-1977

242 (5%) additional procedures (no incidental appendectomies included)

Biggers, Ready, Beart.
INCIDENTAL SURGERY

- Cholecystectomy 81
- Oophorectomy 35
- Hysterectomy 28
- Panhysterectomy 30
- Splenectomy 17
- Inquinal herniorrhaphy 25
- Liver resection 4
- Small bowel 4
INCIDENTAL SURGERY

- Mortality (0.8%)
- Complications (2%)

SAFE!
INCIDENTAL SURGERY

▼ Unexpected Pathology
appendiceal masses
gallstones
Meckel’s diverticula
AAA/CR Ca
INCIDENTAL SURGERY

Appendiceal Masses

- Mucocele
- Carcinoid
- Adenocarcinoma
Appendiceal Mucocele

Definitions

- **Simple mucocele**: appendiceal dilatation with accumulation of mucus due to obstruction of the lumen

- **Cystadenoma**: dilated, mucus-filled appendix containing adenomatous mucosa

- **Cystadenocarcinoma**: adenocarcinoma associated with a dilated, mucus-filled appendix

*AFIP, 1990*
Appendiceal Mucocele
Patients and Methods

- Primary appendiceal mucoceles 1976-2000
- Surgery: simple mucocele (62 pts), cystadenoma (20 pts), cystadenocarcinoma (47 pts)
- Clinical, diagnostic, and surgical variables
## Appendiceal mucocele

### Symptoms and Malignancy

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Malignancy</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall symptoms</td>
<td>58%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No symptoms</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>56%</td>
<td>0.005</td>
</tr>
<tr>
<td>No abdominal pain</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>Abdominal mass</td>
<td>86%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No abdominal mass</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Weight loss</td>
<td>77%</td>
<td>0.002</td>
</tr>
<tr>
<td>No weight loss</td>
<td>31%</td>
<td></td>
</tr>
</tbody>
</table>
## Appendiceal Mucocele

### Diagnosis and Presentation

| Malignancy |  
|------------|---
| Preoperative diagnosis | 58% | 0.014 |
| No preoperative diagnosis | 31% |
| Pseudomyxoma peritonei | 95% | <0.001 |
| No pseudomyxoma | 13% |
| Mucocele extravasation | 83% | <0.001 |
| No extravasation | 15% |
Appendiceal Mucocele

Cystadenoma Size

<table>
<thead>
<tr>
<th>Cystadenoma</th>
<th>Simple Mucocele</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean size</td>
<td>8.1 cm</td>
<td>4.1 cm</td>
</tr>
</tbody>
</table>

\[\text{No cystadenoma was } \leq 2 \text{ cm in diameter}\]
Appendiceal Mucocele

Summary

Abdominal pain, abdominal mass, weight loss, pseudomyxoma peritonei, and mucocele extravasation are indicative of malignant mucocele.
Appendiceal Mucocele

Conclusions

All mucoceles $\geq 2 \text{ cm}$ should be removed
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Carcinoid

▼ More common than mucoceles
- 0.3% of appendectomies
- appendiceal tip
- 70-90% < 1 cm
- simple appendectomy - <2 cm
  no metastasis
- right hemicolecetomy -> 2 cm,
  base increased nodes
Adenocarcinoma of the Appendix

Appendiceal Neoplasms - Classification

- Carcinoid (85%)
- Mucinous type adenocarcinoma (malignant mucocele) 8%
- Colonic type adenocarcinoma (4%)
- Adenocarcinoid (2%)
Adenocarcinoma of the Appendix


- 94 patients (52 men, 42 women)
- Age (x ± SEM) 56.5 ± 2 years (range 18-88 years)
## Adenocarcinoma of the Appendix

### Clinical Presentation

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute right lower quadrant pain*</td>
<td>47</td>
<td>50</td>
</tr>
<tr>
<td>Abdominal mass</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Ascites</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Nonspecific GU or GI symptoms</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Incidental finding</td>
<td>19</td>
<td>20</td>
</tr>
</tbody>
</table>

*Clinically acute appendicitis*
Mucinous Adenocarcinoma Colectomy vs Appendectomy

Hemicolectomy (n=29)

Appendectomy (n=18)

P<0.01
<table>
<thead>
<tr>
<th>Site</th>
<th>Syn-Chronous</th>
<th>Meta-Chronous</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal</td>
<td>11</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Tract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genitourinary</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Tract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other*</td>
<td>2</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>16</td>
<td>33</td>
</tr>
</tbody>
</table>

*Breast, lung, lymphoma, melanoma, thyroid, chondrosarcoma
Carried out in 23 patients
Metastases were found in 14 pt (57%)
9/14 were clinically involved
4/14 had only occult metastases (29)
Adenocarcinoma of the Appendix

Conclusion

- Right hemicolecotomy is the treatment of choice for appendiceal cancer
- Oophorectomy is recommended, especially in the postmenopausal pt
- Search for synchronous primary tumors and follow up to detect metachronous tumors are warranted
# Table: Adenocarcinoid Initial # Pts. Mean Survival Overall Disease Specific p-Value (3)

<table>
<thead>
<tr>
<th>Stage</th>
<th># Pts.</th>
<th>Mean Survival (months ± se)</th>
<th>5-yr Survival</th>
<th>5-yr Survival Probability (%)</th>
<th>Disease Specific Probability (%)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I(1)</td>
<td>8</td>
<td>NA</td>
<td>88</td>
<td>100</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>II(2)</td>
<td>20</td>
<td>50 (±3)</td>
<td>70</td>
<td>76</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>6</td>
<td>30 (±7)</td>
<td>22</td>
<td>22</td>
<td>0.048</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>23</td>
<td>32 (±4)</td>
<td>14</td>
<td>14</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>all</td>
<td>57</td>
<td>47 (±3)</td>
<td>45</td>
<td>47</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note:

1) One patient in stage I had peritoneal carcinomatosis from pancreatic primary and an incidental appendectomy showing GCC. Patient died within the same hospitalization from pancreatic adenocarcinoma.

2) A patient in stage II died from small cell lung cancer.

3) P-Value from log rank test comparing stage II-IV relative to stage I, i.e. II vs I, III vs I, IV vs I.
Adenocarcinoid

Ovarian metastasis number percent

18 49
Incidental Cholecystectomy
Incidental Cholecystectomy

Does Incidental Cholecystectomy Significantly Increase Operative Morbidity?

Previous studies

- Contradictory results
- Either no control group or questionable control group
Incidental Cholecystectomy

If patients with asymptomatic gallstones do not undergo incidental cholecystectomy, what is the long-term risk of developing gallstone related complications:

Previous studies

- Diverse results (1% per year to >20% per year)
- Different:
  - Methods of gallstone detection
    - (operative vs OCG)
  - Definitions of symptoms
Ohio Woman Has a 3rd Eye

Kindergarten teacher baffles docs.

In the back of her head!

Husband's love cured my nymphomania!
Asymptomatic Gallstones at Colorectal Operation

- 305 patients
- Median age: 70 years
- 54% female
- 92% elective procedures
- Median follow-up 6.4 years
- Of 161 surviving patients 141 returned questionnaire
Asymptomatic Gallstones at Colorectal Operation

305 Patients

- No cholecystectomy (110)
- Cholecystectomy (195)
Short-Term Biliary Complications

No cholecystectomy

- 2.7% (3 patients)
  - 1 cholecystitis
  - 1 cholecystitis and pancreatitis
  - 1 pancreatitis

  2 patients ➔ emergency cholecystectomy

Cholecystectomy

- 2.1% (4 patients)
  - 3 temporary bile leak
  - 1 pancreatitis

  No patients ➔ reoperation
## Long-Term Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>No Cholecystectomy (%)</th>
<th>Cholecystectomy (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small bowel obstruction</td>
<td>5.5</td>
<td>7.2</td>
<td>NS</td>
</tr>
<tr>
<td>Biliary</td>
<td>14.6</td>
<td>0.5</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
Long-Term Biliary Complications
No Cholecystectomy Group (110 patients)

- Mean follow-up 6.0 years
- 16 patients (14.6%) developed biliary complications
  - 10 biliary pain (7 ➔ cholecystectomy)
  - 6 cholecystitis (5 ➔ cholecystectomy)
No Cholecystectomy Group
(110 patients)

- Of 56 patients alive at time of study, 45 returned questionnaire
- Mean follow-up 8.0 years
- 12 patients (26.7%) developed biliary symptoms
  
  10 ➔ cholecystectomy

- Cumulative probability of undergoing cholecystectomy at 5 years: 31.1%
Other Considerations

- Prevention of **gallbladder cancer**
  “…one fewer death from gallbladder cancer occurs for about every 100 cholecystectomies done during the preceding year.”
  
  Diehl and Beral: Lancet, 1981

- High mortality with **acute postoperative cholecystitis**
  Mortality rate of 47% in one series of 40 patients
  

- Resident training
Conclusion

These data suggest that patients with asymptomatic gallstones undergoing colorectal operations, in whom there are no contraindications, should undergo concomitant cholecystectomy.
Incidental Cholecystectomy Over Age 70

1975-1994

291 had incidental cholecystectomy (with GI malignancy ops)

68 over age 70

Age, sex, matched controls with gallstones left in situ

Incidental Cholecystectomy
Over Age 70

No cholecystectomy group

↑ pulmonary complications (NS)

↑ sepsis & multiorgan failure (O in IC)

6 pt (P<0.01)

4 postop cholecystitis (died)

Incidental Meckel’s Diverticulectomy
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Meckel’s Diverticulum

▼ Resection asymptomatic diverticulum
   - 1.2-8.9% complication rate

▼ Risk of not resecting (202 patients*)
   - 4.2% at age one
   - 2% at age 30
   - 0% at age 70

▼ 800 resections to prevent one death from Meckel’s

▼ Leave in older patient

*Soltero, Bill 1976
Meckel’s Diverticulum

145 pt. Olmsted Co., MN
1950-1992
58 pts. - complications of Meckel’s (symptoms)
87 pts. incidental diverticulectomy
*2% of general population have Meckel’s

Cullen, Kelly Ann. Surg. 1994
Indications for Diverticulectomy in 58 Symptomatic Olmsted County, Minnesota Residents with a Meckel’s Diverticulum

<table>
<thead>
<tr>
<th>Indication</th>
<th>Patients*(no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage</td>
<td>16</td>
</tr>
<tr>
<td>Obstruction</td>
<td>15</td>
</tr>
<tr>
<td>Intussusception</td>
<td>1</td>
</tr>
<tr>
<td>Diverticulitis</td>
<td>13</td>
</tr>
<tr>
<td>Perforation</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>

*1 patient had obstruction and perforation and another had obstruction and diverticulitis*
Meckel’s

Incidence/100,000 person-years

Age group

0-9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 ≥80

0 5 10 20 50 100 200 500

Age group
Meckel’s

Cumulative lifetime risk (%) vs. Age (years)
Meckel’s Diverticulectomy

- Lifetime cumulative incidence of operation for complications of Meckel’s (to 80) - 6.4%
- Men > women
- No consistent age-related trend (i.e. ↑ in childhood)

Cullen, Kelly Ann. Surg. 1994
MAYO M.D.

WHICH TO RESECT?

- Wide based vs narrow?
- Long vs short?
- Lumpy ones?
- Males vs females?
- Peds vs adults?
- Symptomatic only?
- All of them?
MAYO M.D.
1476 pts.

- 1% incidence in general population
- Most common presentation in children - obstruction
- Most common presentation in adults - bleeding
- Symptomatic M.D. - 3:1 rule
  - 75% occur after age 10
  - 75% males (peds & adults)
  - 75% bleeding M.D. will contain ectopic gastric tissue
THE WOLFF CRITERIA

- Age less than 50
- Male gender
- Length greater than 2 cm
- Ectopic or abnormal tissue
Summary

- Incidental Surgery - Safe
- Appendiceal Masses:
  - Mucocele
    - Remove if ≥ 2 cm
  - Carcinoid
    - Simple Appy - 2 cm, no Mets
    - Right Hemicolecotmy - ≥ 2 cm, at base, nodes
  - Adenocarcinoma of Appendix
    - Right Hemicolecotmy, oophorectomy, Syn, Metachronous tumors
Incidental Cholecystectomy
- good risk patients, good prognosis

Incidental Meckel’s
- Remove if: Age <50
  Male
  Length >2 cm
  Ectopic or abnormal tissue

Oophorectomy (colorectal cancer)
- ? Maybe