實證醫學病例討論報告

101/7/02

Presenter：R1 巫承哲

臨床場景(clinical scenario)

臨床場景1~病人基本資料及主訴

- The 7 y/o female presented with Abdominal pain since 06/29 morning.
- Associated S/S:

  fever(-), cough(-), dyspnea(-), nausea(+) , vomiting(-), diarrhea(-), anorexia(-), tarry stool(-), dysuria(-), periumbilical pain(+),rebounding pain(+), meuscle guarding(-).
- blood examination :leukocytosis with neutrophlia.
- Plain abdomen x-ray :mild localized ileus pattern over terminal ileum with some stool impaction.
- Under the impression of acute appendicitis

臨床場景1~病人基本資料及主訴

- ## At our ER

WBC	Blood	14.4	4.4~11.3;<1day:14.3~	x1000/	1010629	0844
RBC	Blood	3.98	男:4.5~5.9;女:4.0~5.	x10^6/	1010629	0844
Hgb	Blood	12.5	男:14~17.5;女:12.3~1	g/dL	1010629	0844
Hct	Blood	35.5	男:41.5~50.4;女:35.9	%	1010629	0844
MCV	Blood	89.1	80.0~96.1;<1day:103.	fl	1010629	0844
MCH	Blood	31.4	27.5~33.2;<1day:33.9	Pg	1010629	0844
MCHC	Blood	35.3	33.4~35.5;<1day:32.5	%	1010629	0844
PLT	Blood	186	172~450;	x1000/	1010629	0844
RDW	Blood	12.0	11.6~14.6;	%	1010629	0844
NEUT	Blood	85.2	40~75;<1day:61.2~79.	%	1010629	0844
EOSIN	Blood	1.0	1~7;<1day:0~3.3;	%	1010629	0844
BASO	Blood	0.2	0~2;	%	1010629	0844
LYMPH	Blood	9.7	20~50;<1day:12.9~27.	%	1010629	0844
MONO	Blood	3.9	1~10;<1day:3.5~9.5;	%	1010629	0844

臨床場景2~診斷

- Diagnosis:R/O acute appendicitis

臨床場景3~治療方式及對治療的反應

- Operation was arranged on 06/29 and after operation, no fever and pain subsided.

Asking (提出臨床問題）

提出 background questions

Background question

- Question: how to differential diagnosis acute appendicitis in children

Question 1 ~ how to differential diagnosis acute appendicitis in children

- performing the following tests in patients in whom the diagnosis of appendicitis is being considered (White blood cell count with differential)
- Urinalysis
- Urine b-human chorionic gonadotropin (pregnancy test) in postmenarchal females
- In children with a typical clinical presentation for acute appendicitis, we suggest clinicians consult a surgeon with experience caring for children prior to obtaining imaging studies.
- In children who are unlikely to have appendicitis based upon the clinical examination and laboratory studies (absolute neutrophil count less than 6750/mm3; absence of nausea or vomiting; absence of maximal tenderness in the right lower quadrant) we suggest observation and close follow-up without imaging.
- For all other children with suspected appendicitis, we suggest further evaluation with diagnostic imaging and/or consultation with a surgeon Specific recommendations regarding imaging studies are discussed above and in detail elsewhere.

from uptodate: Acute appendicitis in children: Clinical manifestations and diagnosis

提出 foreground question

寫成PICO
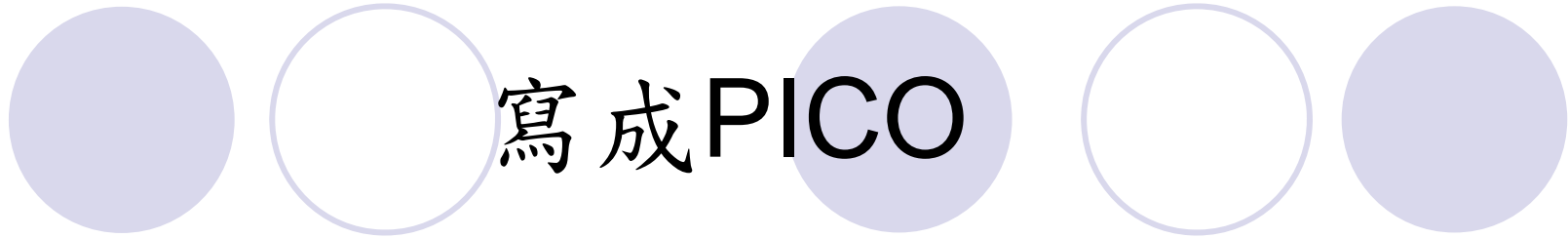
P	A child with abdominal pain, r/o acute appendicitis
I	use diagnostic CT or with US
C	US or PE only
O	Rate of accurate diagnosis

搜尋最有用的資料

Up to date
ACP medicine
ACP pier

**Evidence-
Based
Medicine(BMJ)**

**Cochrane
Library**

PubMed
SUMsearch
Google

Systems

Synopses

Syntheses

Studies

Examples

Computerised decision
support systems (CDSS)

Evidence-based journal
abstracts

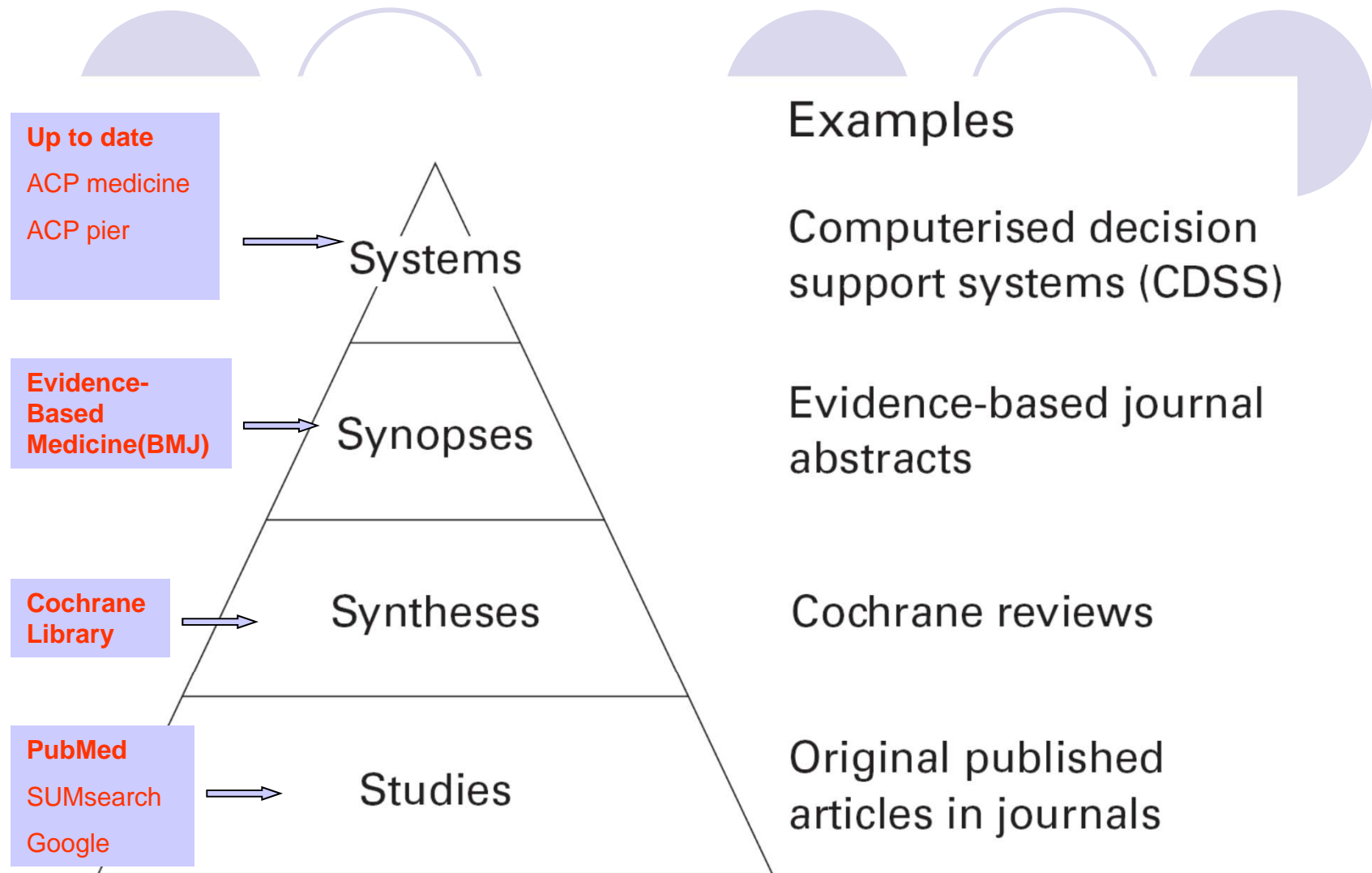Cochrane reviews

Original published
articles in journals

Figure "4S" *levels of organisation of evidence from research.*

搜尋Systems

- Key word:
- Child, appendicitis,imaging

搜尋到的文章標題

- Acute appendicitis in children: Clinical manifestations and diagnosis
- **Acute appendicitis in children: Diagnostic imaging**
- Acute appendicitis in children: Management
- Evaluation of diarrhea in children
- Causes of acute abdominal pain in children and adolescents
- Evaluation of acute pelvic pain in the adolescent female
- What's new in pediatrics
- Acute appendicitis in pregnancy
- Approach to the infant or child with nausea and vomiting
- Emergent evaluation of the child with acute abdominal pain
- Acute appendicitis in adults: Management
- Clinical features and diagnosis of nephrolithiasis in children
- Evaluation of inguinal swelling in children
- Diagnosis of inflammatory bowel disease in children and adolescents

INTRODUCTION

INDICATIONS

CLINICAL PROTOCOLS

DIAGNOSTIC APPROACH

ULTRASONOGRAPHY (US)
- Test performance
- Techniques
  - Posterior compression
  - Positional scanning
- Pitfalls and limitations of US
- Sonographic findings

COMPUTED TOMOGRAPHY (CT)
- Test performance
- Techniques
  - Contrast
  - Focused CT
  - CT scanning parameters
- Pitfalls and limitations of CT
- CT findings

搜尋到的文章內容摘要

- We recommend that imaging in children with atypical or equivocal findings for appendicitis begin with ultrasonography (US).

- If the appendix is not visualized or the findings on US are otherwise not diagnostic, the patient may either be observed with serial physical examinations and repeated imaging (US or CT) performed at a later time if a clinical diagnosis of appendicitis cannot be made or, if more prompt diagnosis is desired, the patient may directly proceed to contrast-enhanced computed tomography (CT).

- We begin the CT evaluation with the pelvis (third lumbar vertebra to pubic ramus) and expand the study to include the entire abdomen if an abnormality is seen on the uppermost image.

- Given the limitation of ultrasound in obese children, some clinicians may choose to perform contrast CT as the initial imaging strategy in this population.

搜尋到的文章內容摘要

- We suggest that children with suspected appendicitis and equivocal findings on ultrasound undergo contrast-enhanced computed tomography (CT) with intravenous contrast rather than no contrast.

- In addition, we suggest that these children undergo contrast-enhanced computed tomography (CT) with intravenous contrast alone rather than intravenous contrast combined with enteral (oral or rectal) contrast

將system搜尋的結果應用到我的病人

- **acute appendicitis:**

  if atypical or equivocal findings for appendicitis begin with ultrasonography (US) and if the finding was equivocal , can undergo contrast-enhanced computed tomography (CT).

搜尋Synopses，Evidence-Based Medicine(BMJ)

3. The Paediatric Appendicitis Score (PAS) was useful in children with acute abdominal pain -- 14 (1): 26 -- Evidence-Based Medicine
Evidence-Based Medicine
http://ebm.bmj.com/content/14/1/26.full

The Paediatric **Appendicitis** Score (PAS) was useful in children with acute abdominal pain. ... ABSTRACTED FROM. Goldman RD, Carter S, Stephens D,. et al. Prospective validation of the **Pediatric Appendicitis** Score.

4. Management of suspected appendicitis in children -- Acheson and Banerjee 95 (1): 9 -- ADC - Education and Practice
ADC Education & Practice
http://ep.bmj.com/content/95/1/9.full

Best practice. Management of suspected **appendicitis** in children. ... Abstract. Acute **appendicitis** is the most important cause of abdominal pain in children and is the commonest that requires emergency surgery.

5. Can we improve diagnosis of acute appendicitis? -- Beasley 321 (7266): 907 -- BMJ
British Medical Journal
http://www.bmj.com/cgi/content/full/321/7266/907

BMJ 2000; 321: 907-908 (14 October). Editorials. Can we improve diagnosis of acute **appendicitis**. Ultrasonography may complement clinical assessment in some patients. ... Does early ultrasonography affect management of **pediatric appendicitis**. A prospective analysis.

6. CT and appendicitis: evaluation of correlation between CT diagnosis and pathological diagnosis -- Andre et al. 84 (992): 321 -- Postgraduate Medical Journal
Postgraduate Medical Journal
http://pmj.bmj.com/content/84/992/321.full

Postgrad Med J. 2008; 84: 321-324 doi: 10.1136/pgmj.2007.066779. Original article. CT and **appendicitis**: evaluation of correlation between CT diagnosis and pathological diagnosis. ... Results: The mean size of appendixes meeting the CT size criteria of **appendicitis** was 10.3 mm, and...

British Journal of Ophthalmology (404)

Thorax (399)

more..

搜尋到的文章標題

- ## Title:

CT and appendicitis: evaluation of correlation between CT diagnosis and pathological diagnosis

搜尋到的文章內容摘要

- The mean size of appendixes meeting the CT size criteria of appendicitis was 10.3 mm, and that of the surgical pathology specimens was 10.4 mm.

- The pathological diagnosis of acute appendicitis was confirmed in 54 of 56 cases, yielding a positive predictive value of 96.4%.

搜尋 syntheses, Cochrane Central Register of Controlled Trials

- Key word:
- pediatric appendicitis and imaging
- Result:0

搜尋 Studies, Pubmed

- ## Key word:
- ## pediatric appendicitis and imaging

PMID: 21451202 [PubMed - indexed for MEDLINE]
Related citations

30. Revised ultrasound criteria for **appendicitis** in children improve diagnostic accuracy.
Goldin AB, Khanna P, Thapa M, McBroom JA, Garrison MM, Parisi MT.
Pediatr Radiol. 2011 Aug;41(8):993-9. Epub 2011 Mar 16.
PMID: 21409546 [PubMed - indexed for MEDLINE]
Related citations

31. Effectiveness of a staged US and CT protocol for the diagnosis of **pediatric appendicitis**: reducing radiation exposure in the age of ALARA.
Krishnamoorthi R, Ramarajan N, Wang NE, Newman B, Rubesova E, Mueller CM, Barth RA.
Radiology. 2011 Apr;259(1):231-9. Epub 2011 Jan 28.
PMID: 21324843 [PubMed - indexed for MEDLINE]   Free Article
Related citations

32. Clinical outcomes in obese and normal-weight children undergoing ultrasound for suspected **appendicitis**.
Sulowski C, Doria AS, Langer JC, Man C, Stephens D, Schuh S.
Acad Emerg Med. 2011 Feb;18(2):167-73. doi: 10.1111/j.1553-2712.2010.00993.x.
PMID: 21314776 [PubMed - indexed for MEDLINE]
Related citations

搜尋到的文章標題

Title:

Effectiveness of a staged US and CT protocol for the diagnosis of pediatric appendicitis: reducing radiation exposure in the age of ALARA.

Krishnamoorthi R, Ramarajan N, Wang NE, Newman B, Rubesova E, Mueller CM, Barth RA.

Source:Department of Pediatric Radiology, Lucile Packard Children's Hospital at Stanford University School of Medicine, 725 Welch Rd, Rm 1690, Stanford, CA 94305-5913, USA.

搜尋到的文章內容摘要

- In the staged protocol, US was performed first in patients suspected of having appendicitis; follow-up CT was recommended when US findings were equivocal.

- Of 1228 pediatric patients who presented to the emergency department for suspected appendicitis, 631 were compliant with the imaging pathway.

搜尋到的文章內容摘要

- The sensitivity and specificity of the staged protocol were 98.6% and 90.6%, respectively. The negative appendectomy rate was 8.1% (19 of 235 patients), and the missed appendicitis rate was less than 0.5% (one of 631 patients).

- CT was avoided in 333 of the 631 patients (53%) in whom the protocol was followed and in whom the US findings were definitive.

將Studies的搜尋結果應用到病人身上

- If PE, history, lab data can't r/o appendicitis, should arrange US first and if the finding was equivocal, can arrange CT.

Appraisal (嚴格評讀）

對找到的文章
進行critical appraisal

證據等級(針對PubMed這篇)

Level	與[治療/預防/病因/危害]有關的文獻
1a	用多篇RCT所做成的綜合性分析(SR of RCTs)
1b	單篇RCT(有較窄的信賴區間)
1c	All or none
2a	用多篇世代研究所做成的綜合性分析
2b	單篇cohort及低品質的RCT
2c	Outcome research / ecological studies
3a	SR of case-control studies
3b	Individual case-control studies
4	Case-series(poor quality :cohort / case-control studies)
5	沒有經過完整評讀醫學文獻的專家意見

Grades of Recommendation

A	consistent level 1 studies
B	consistent level 2 or 3 studies *or* extrapolations from level 1 studies
C	level 4 studies *or* extrapolations from level 2 or 3 studies
D	level 5 evidence *or* troublingly inconsistent or inconclusive studies of any level

使用work sheet嚴格評讀

Critical Appraisal of Therapy Study
"治療研究" 的評析

- Are the results of the trial valid (效度如何)？
  - Was the assignment of patients to treatment randomised (是隨機分配嗎)？
  - Were the groups similar at the start of the trial (試驗開始時兩組條件是否相似)？
  - Aside from the allocated treatment, were groups treated equally (兩組其他治療條件一樣)？
  - Were all patients who entered the trial accounted for and were they analysed in the groups to which they were randomised (所有進入試驗者皆列入統計，並依所分配的組別計算)？
  - Were measures objective or were the patients and clinicians were blinded (結果的測量客觀，受試者及醫師都不知道所接受的治療為何)？
- What were the results (結果為何)？
  - How large was the treatment effect (治療效果有多大)？
  - How precise was the estimate of the treatment effect (治療效果的預測多準確)？
- Will the results help me in my patient care (適用於我的病人嗎)？

Was the assignment of patients to treatment randomised
是隨機分配嗎？

最理想狀況為何？	何處找到相關訊息？
理想狀況是以中央電腦隨機分配，尤其是跨中心的研究 較小型臨床試驗也可以 "獨立人士" 執行隨機分配	"研究方法" 應敘述受試者如何做分配，是否隱藏式隨機分配

☐是   ☐否   ☐不清楚

評論：<u>all the studies were</u>

Were the groups similar at the start of the trial
試驗開始時兩組條件是否相似？

最理想狀況為何？	何處找到相關訊息？
如果隨機分配的方式及過程無誤，實驗組與對照組應該相似 應有統計比較兩組是否有差異	在文章中沒有詳細描述兩組的條件如何

　□是　　　　　□否　　　　　□不清楚

評論：1.最後都有經過確切的病理報告做為證據

Were the groups similar at the start of the trial
試驗開始時兩組條件是否相似？

Table 3

Outcomes in Compliant Patients (n = 631)

Imaging Outcome	Final Diagnosis		Surgical Outcome		Nonsurgical Outcome	
	Appendicitis	No Appendicitis	Positive Appendectomy*	Negative Appendectomy	No Appendicitis	Missed Appendicitis[†]
US positive, no CT (n = 176)	152	24	152	8	16	0
US negative, no CT (n = 157)	2	155	1	1	154	1
US equivocal (n = 298)						
CT positive (n = 77)	62	15	62	5	10	0
CT negative (n = 221)	1	220	1	5	215	0
Total (n = 631)	217	414	216[‡]	19[§]	395	1

Note.—Data are numbers of patients.

*Appendicitis was diagnosed at pathologic examination.

[†] Missed appendicitis refers to appendicitis that was missed at the initial presentation, resulting in a delayed diagnosis.

[‡] The positive appendectomy rate was 91.9%.

[§] The negative appendectomy rate was 8.1%.

Aside from the allocated treatment, were groups treated equally 兩組其他治療條件一樣？

最理想狀況為何？	何處找到相關訊息？
除了要研究的治療方式或檢驗外，兩組病人所接受的其他治療都一樣	"研究方法" 中所敘述的追蹤計劃，允許的追加治療 "研究結果" 中兩組實際接受各項額外治療的種類與比例

☐是　　　　　☐否　　　　　☐不清楚

評論：是，除診斷非盲腸炎的病人外，
　　　　最後都是採取手術治療

Were all patients who entered the trial accounted for and were they analysed in the groups to which they were randomised
所有進入試驗者皆列入統計，並依所分配的組別計算？

最理想狀況為何？	何處找到相關訊息？
統計分析時應按照病人隨機分配的組別計算(Intention-to-treat analysis)，而避免有病患流失的情況	"研究結果"中應說明多少病人接受隨機分配 (table I)，多少病人進入統計分析。病人流失的數目、原因

☐是　　　　　☐否　　　　　☐不清楚

評論：1.本篇文章中最後都是採取手術而無病患留失

Were measures objective or were the patients and clinicians were blinded
結果的測量客觀，受試者及醫師都不知道所接受的治療為何？

最理想狀況為何？	何處找到相關訊息？
雙盲試驗：研究者與受試者皆不知道受試者所接受的治療為何 結果評估的客觀性：結果的判斷若是客觀的（如死亡）較無爭議，但若結果的判斷是主觀的（如症狀、功能、能力）則評估者就不能知道病人是對照組或治療組	"研究方法"應說明對照組如何做偽裝治療，如給予外觀一樣的安慰劑 "研究方法"應說明如何做結果評估，評估者是否知道病人接受的治療為何

□是　　　　　　　□否　　　　　　　□不清楚

評論：最後的治療方式皆為手術，所以無法做到雙盲試驗。

How precise was the estimate of the treatment effect 治療效果的預測多準確？

Diagnostic Characteristics of the Staged US and CT Pathway according to Subgroup

Subgroup	No. of Patients	Sensitivity*	Specificity*
Age (y)			
<4	62	1.0 (0.93, 1.04)	0.96 (0.90, 1.0)
5–12	341	0.99 (0.97, 1.0)	0.89 (0.85, 0.93)
>12	228	0.98 (0.95, 1.0)	0.91 (0.86, 0.96)
Study year			
2003–2005	209	0.98 (0.95, 1.0)	0.92 (0.88, 0.97)
2006–2008	422	0.99 (0.97, 1)	0.89 (0.86, 0.93)
Sex			
M	287	0.99 (0.96, 1.0)	0.92 (0.88, 0.95)
F	344	0.98 (0.96, 1.0)	0.89 (0.85, 0.93)

Note.—There were no statistically significant differences in the sensitivity and specificity among subsets (age: $P = .74$ for sensitivity and .28 for specificity; study year: $P = .587$ for sensitivity and .448 for specificity; sex: $P = .99$ for sensitivity and .40 for specificity).

* Numbers in parentheses are the 95% confidence interval.

Will the Results Help Me in Caring for My Patients ?

- Are the people in the study like my patient ?
  - Age: wide range: 0-17years old → could apply
  - General state of health: R/o acute appendicitis
  - Type and severity of disease process: as above →could apply
  - Time in the course of the disease: not mentioned
- Did the study cover all aspects of problem ?
  - eg treatment effect on symptom relief, quality of life, mortality etc →no, it didn't
- Is the treatment feasible in my setting ?→Mostly feasible
- Will the potential benefits of treatment outweigh the potential harms of treatment for my patients ? →yes!
- Does it suggest a clear and useful plan of action ?
  - Help to clarify a patient's prognosis → yes!
  - Suggest a useful plan to improve patient's state of health → yes!

Apply

結合醫學倫理方法

將study的結果應用在病人身上

醫療現況	病人意願
依照目前高醫的治療，以及EBM搜尋的證據等級結果，使用在無法確診的盲腸炎上還是會進行電腦斷層掃描。	病人對於我們的治療並沒有特別的偏好。

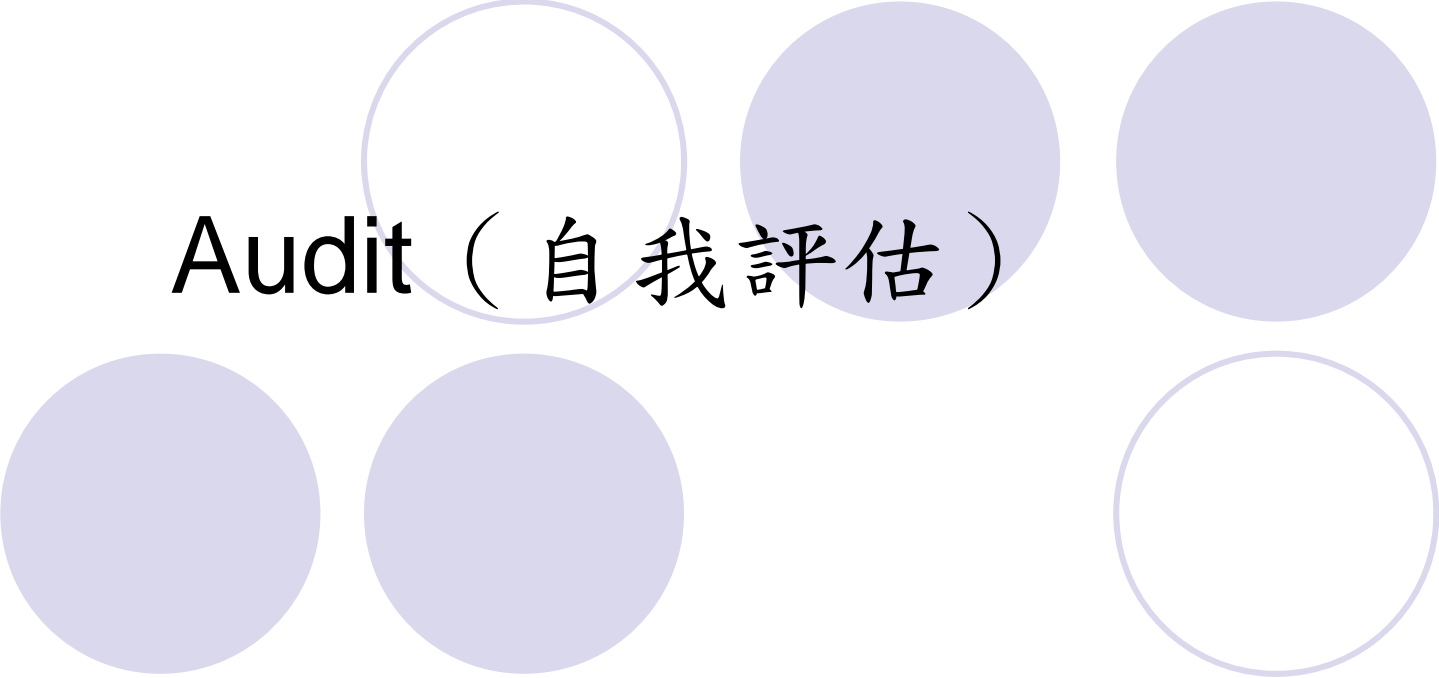| 生活品質	社會脈絡
依EBM之結果，可以減低rate of need to arrange CT and avoid radiation exposure。	並無任何病患的家庭或家族因素影響本次的治療。

總結與討論

- 此位病人在術前的症狀不能完全確診為盲腸炎，但是如果需要進一步確診的話，可建議先執行超音波進行鑑別診斷，如果無法得到結果的話，才進一步建議是否使用電腦斷層做為確診。

Audit（自我評估）

在「提出臨床問題」方面的自我評估

- 我提出的問題是否具有臨床重要性？是，可有效減低放射線的暴露

- 我是否明確的陳述了我的問題？是。
  - 我的foreground question 是否可以清楚的寫成 PICO？是。
  - 我的background question是否包括what, when, how, who等字根？是。

- 我是否清楚的知道自己問題的定位？（亦即可以定位自己的問題是屬於診斷上的、治療上的、預後上的或流行病學上的），並據以提出問題？是，這次問題是屬於診斷上的。

- 對於無法立刻回答的問題，我是否有任何方式將問題紀錄起來以備將來有空時再找答案？是。

在「搜尋最佳證據」方面的自我評估

- 我是否已盡全力搜尋？是。

- 我是否知道我的問題的最佳證據來源？是。

- 我是否從大量的資料庫來搜尋答案？是。

- 我工作環境的軟硬體設備是否能支援我在遇到問題時進行立即的搜尋？是，但速度有點慢。

- 我是否在搜尋上愈來愈熟練了？是。

- 我會使用「斷字」、布林邏輯、同義詞、MeSH term，限制（limiters)等方法來搜尋？我對其中一些搜尋方式還不熟悉。

- 我的搜尋比起圖書館人員或其他對於提供病人最新最好醫療有熱情的同事如何？熟練程度比起相關人員還是差距很多。

關於「嚴格評讀文獻」方面的自我評估

- 我是否盡全力做評讀了？是。
- 我是否了解Number need to treat 的意義？是。
- 我是否了解Likelihood Ratios的意義？是。
- 我是否了解worksheet每一項的意義？是。
- 評讀後，我是否做出了結論？是。

關於「應用到病人身上」的自我評估

- 我是否將搜尋到的最佳證據應用到我的臨床工作中？是。

- 我是否能將搜尋到的結論如NNT, LR用病人聽得懂的方式解釋給病人聽？可以。

- 當搜尋到的最佳證據與實際臨床作為不同時，我如何解釋？會都提出優缺點由病患或家屬做決定。

改變「醫療行為」的自我評估

- 當最佳證據顯示目前臨床策略需改變時，我是否遭遇任何阻止改變的阻力？沒有經驗。

- 我是否因此搜尋結果而改變了原來的治療策略？做了那些改變？否，無改變。

效率評估

- 這篇報告，我總共花了多少時間？約4個晚上

- 我是否覺得這個進行實證醫學的過程是值得的？尚可，但希望提升速度。

- 我還有那些問題或建議？目前無。

Thanks for attention!!