Antibiotic Prophylaxis Prescribing in Appendectomy Procedures in Children

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Introduction

- Appendectomy has been performed for more than 100 years
- Diagnosis based upon physical examination
- Marked decline in appendectomies over the past 25 years in Western Australia
- Approximately 60% of appendectomies were acute emergency admissions

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Wound infections or intra-abdominal abscess prevalence

- Simple and Complicated 0.6 – 6%
- Simple 2%

Significant additional cost with postoperative infections especially in prolonged hospital stays and possibly increased resistance bioburden

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Guideline implementation and effectiveness

- Dissemination alone unlikely to influence behaviour
- Reviews of current practice may improve knowledge but usually do not change practice
- Intervention campaigns usually improve concordance but are often short lived
- Introduction with an audit system, take account of local circumstances and supported with educational measures and/or reminders have been more successful
- Fear of litigation

Grilli R, Lomas J. Evaluating the message: the relationship between compliance rate and the subject of a practice guideline. Medical Care 1994;32:202-13

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Antibiotic prophylaxis

- Basic principles established in the 1960’s by Burke*
- Studies point to its use in all appendectomy procedures (Indication)
- Requires:
  - correct antibiotic,
  - correct dose,
  - correct timing,
  - correct route of administration. Further administration if surgery is delayed or prolonged.

* Burke JF. The effective period of preventive antibiotic action in experimental incisions and dermal lesions. Surgery 1961:50;161-8

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Methodology

- Princess Margaret Hospital for Children (250 bed teaching hospital)
- Pre-post design with control groups from other similar hospitals but not targeted by guidelines
- Control groups Fremantle Hospital and Royal Children’s Hospital Melbourne
- Data were collected from medical records into a pre-prepared coded form. Pre-intervention for 6 months. Intervention 3 months. Post-intervention 6 months. Subsequently followed (no control) 24 months.

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Methodology (Contd.) Intervention:

- Newsletter of key prescribing findings to medical and other appropriate staff
- Chief Pharmacist held discussions with appropriate staff (surgeons, clinical microbiology)
- Senior pharmacist gave a presentation to surgeons (not all attended)
- Regular follow-up by clinical pharmacists reinforcing Group 1 (Pre) data
- Guideline posters were displayed in wards and operating theatres

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Methodology (Contd.)

- Study received approval from University and Hospital Research Ethics Committees
- Appropriate dose ± 25% of recommended dose
- Guidelines which were adopted by the hospital
- Statistical analyses of patient parameters used independent sample t-tests; differences in antibiotic parameters χ^2. Bonferroni method was used to control α-level for multiple comparisons. Linear regression analysis was used to evaluate the post-intervention group

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Antibiotic guidelines (2000)

- For prophylaxis including appendectomy

  Metronidazole
  +
  cefalothin or cefazolin or gentamicin
  OR
  cefotetan

  States that meta-analysis has shown prophylaxis is appropriate in all patients undergoing abdominal surgery

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Patient demographics

Test		Number
Pre test		102
Post test		105
Control (A) Pre		99
Control (A) Post		26
Control (B) Pre		119
Control (B) Post		105
Gender		NS
Age	(pre and post)	P = 0.437
	(control (A) pre and post)	0.556
	(control (B) pre and post)	0.052

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Prophylaxis antibiotics prescribed (intervention hospital)

Drug	Pre	Post
Metronidazole	24	6
Ceftriaxone	4	6
Cefotaxime	3	0
Metronidazole + ceftriaxone	44	0
Metronidazole + cefotaxime	8	0
Metronidazole + cefamandole	1	0
Cefotetan	0	68
Ticarcillin	0	7
No prophylaxis	18	18

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Prophylaxis choice of antibiotic

	Nil	Inappropriate	Appropriate	P
Pre	18	84	0	< 0.001
Post	18	15	72	
Control A Pre	14	39	46	0.187
Control A Post	5	5	16	
Control B Pre	32	24	63	0.248
Control B Post	20	29	56	

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Appropriate antibiotic doses for prophylaxis

	Inappropriate	Appropriate	P
Pre test	69 (50%)	68(50%)	<0.001
Post test	6 (6%)	100/106(94%)	
Control A Pre	118/156	38/156	0.020
Control A Post	30/31	1/31	
Control B Pre	128/163	35/163	0.003
Control B Post	99/157	58/157	
Post test Intervention (24 months)	25/241 (10%)	216/241 (90%)	

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Prescribing of unnecessary prophylactic antibiotics

Pre test	52/137	P = < 0.001
Post test	0/87	
Control A Pre	45/148	P = 0.047
Control A Post	4/31	
Control B Pre	13/163	P = 0.961
Control B Post	13/160	

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Mean length of stay

	Days	P value
Pre test	3.34	P < 0.001
Post test	3.83	
Control A Pre	2.27	P = 0.047
Control A Post	2.65	
Control B Pre	4.40	P = 0.961
Control B Post	4.20	

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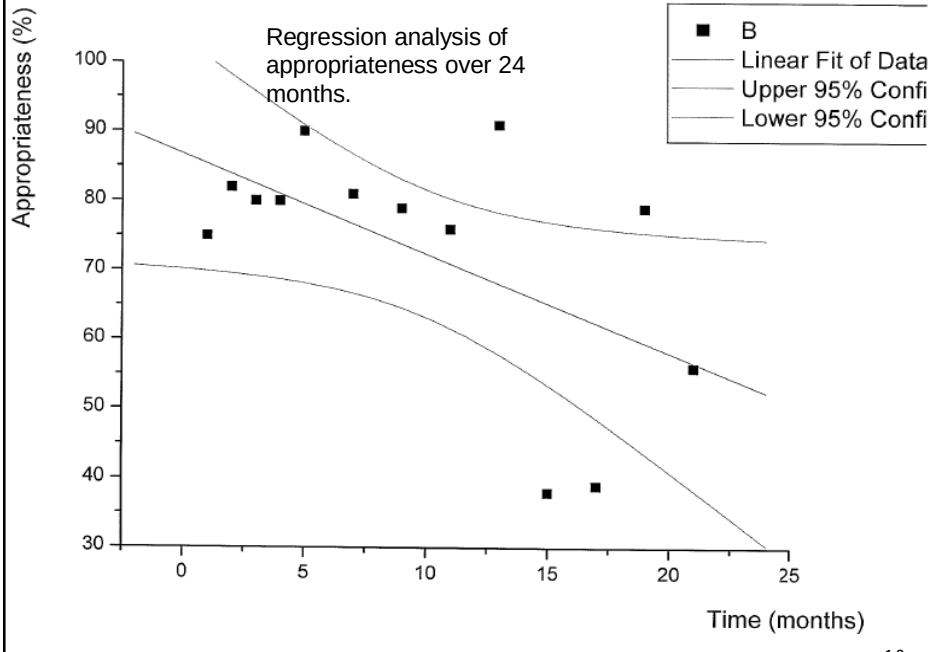

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Conclusions

- The intervention was successful in reducing inappropriate use of prophylaxis antibiotics in appendectomy procedures
- Use of unnecessary antibiotics was eliminated and dosage regimens improved
- The intervention was effective for more than 12 months

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Current antibiotic guidelines for appendectomy (2006)

- Metronidazole

  +

  Cephalothin OR cephazolin OR gentamicin
- Alternatively
- Cefoxitin

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Parenteral Admixture Preparation

Laminar flow hood

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Guidelines for surgical prophylaxis

- Inform practitioners about optimal strategies
- International phenomenon
- Reduce variation in clinical practice
- Desirable outcomes may be different for patients, clinicians and administrators

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Desirable attributes of guidelines

- Appropriate independent presentation in their development
- Based upon scientific evidence and expert opinion
- Identify areas where evidence is weak or consensus could not be reached
- Clear and unambiguously defined
- Applicable to the relevant clinical setting, cost effective, within resources available
- Up to date

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Antibiotic guidelines (2000) - Contd.

Post-surgery if required:

Amoxicillin + gentamicin + metronidazole

OR

Ticarcillin + clavulanate

OR

Metronidazole + cefotaxime

or ceftriaxone

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Diagnosis

	Perforated	Non-Perforated
Pre	12	90
Post	10	95
Control A Pre	0	99
Control A Post	1	23
Control B Pre	25	94
Control B Post	23	82

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