

# **Risk factors for infection following minor surgery in general practice**

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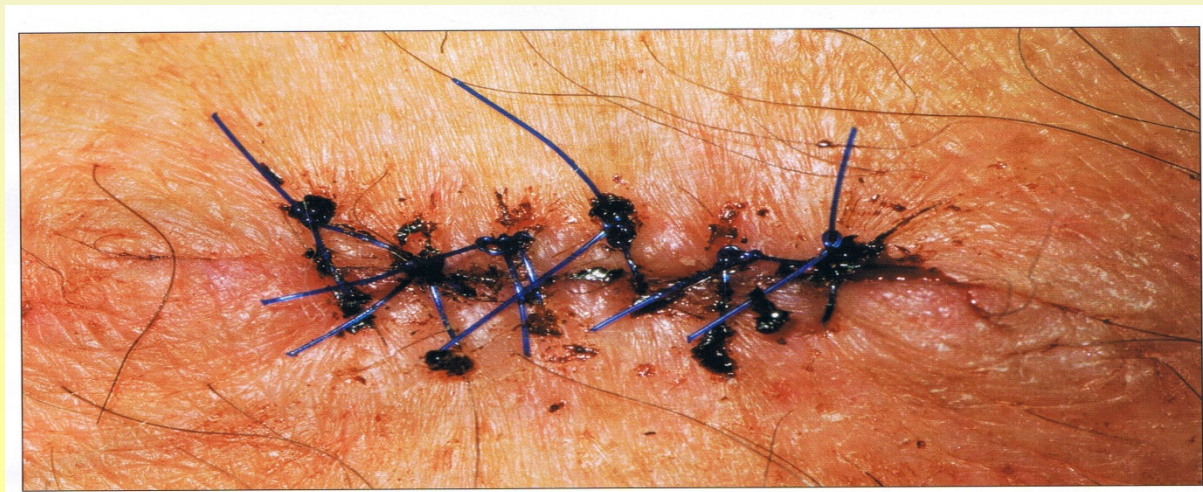
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# Background: Wound infections

- **Acceptable rate of infections after clean minor surgery (Class 1):**  
**<5%**
- **Previous studies from USA, UK, Europe and temperate Australia:**  
**1.5% – 3%**
- **Own general practice based research in tropical Mackay:**  
**74/857 or 8.6% (2005)**  
**85/972 or 8.7% (2007/08) = CURRENT STUDY**

# Clinical Question

**What are the risk factors for infection following minor surgery in general practice?**



## Setting

- JCU - Mackay Rural Clinical School
- Mackay's population about 80,000
- 104 practicing GPs
- No resident dermatologist or plastic surgeon



# Design

- **Secondary analysis of a prospective double-blind randomised controlled trial**
- **Analysis of combined data**
- **Characteristics investigated included:  
Age, gender, body site, histology, season of year, diabetes, serious medical condition, smoking, & surgical procedure**

# Recruitment and Participants



- **15 GPs in 3 practices; one skin cancer clinic**
- **Data collection between June 2007 and May 2008**
- **Consecutive patients presenting for minor skin excision**
- **Practice nurses responsible for recruitment, randomisation and data collection**



# Eligibility criteria



## Inclusion

- Minor skin excision
- Lacerations
- Sutured cysts
- Flap/2 level
- All body sites

## Exclusion

- Oral/topical antibiotics
- Immuno-suppressants
- Inflammed incised sebaceous cysts
- Family history of aplastic anaemia
- History of allergy to chloromycetin ointment

# Surgical wound management protocol

- Skin preparation - normal saline **or** chlorhexidine
- Sterile technique, including sterile gloves
- Local anaesthetic – type and volume recorded
- Suture material – nylon
- Dressing – melolin and tape
- No antibiotics, neither topical nor oral; no topical antiseptics; no antiseptic washes; no medicated soaps
- Removal of sutures – back 10 days, other sites 7 days

# Clinical outcome measure

- CDC National Nosocomial Infection Surveillance System definition of superficial surgical site infection – standardized surveillance criteria:

- 1. Infection within 30 days**

**Involves only skin or subcutaneous tissue**

- 2. a. Purulent discharge from wound, or**

**b. Positive culture, or**

**c. Doctor diagnoses infection**

- 3. Stitch abscess does not count as infection**

- Rather vague – but “gold standard”

## Results – Infection rates

- **Paraffin** (control) 53/484; **11.0%** 95%-CI = [7.7,14.2]
- **Chloramphenicol** (intervention) 32/488; **6.6%** 95%-CI = [4.8, 8.3]
- **Overall** 85/972; **8.7%** 95%-CI = [6.5, 11.0]

# Results: Bivariate statistics 1



## Incidence of infection (85/972)

### AGE

|               |                |         |
|---------------|----------------|---------|
| ≤ 40 years    | 2.9% (4/139)   | P=0.023 |
| 41 – 50 years | 5.1% (7/138)   |         |
| 51 – 60 years | 5.6% (10/178)  |         |
| 61 – 70 years | 10.8% (24/222) |         |
| > 70 years    | 13.6% (40/295) |         |

### BODY SITE

|                |                |         |
|----------------|----------------|---------|
| Face           | 2.2% (5/227)   | P<0.001 |
| Scalp and neck | 4.4% (4/91)    |         |
| Arms and hands | 12.9% (36/279) |         |
| Trunks         | 4.8% (10/210)  |         |
| Thighs         | 16.2% (6/37)   |         |
| Legs and feet  | 18.8% (24/128) |         |

### HISTOLOGY OF LESION

|                              |                |         |
|------------------------------|----------------|---------|
| Melanoma                     | 6.3% (1/16)    | P<0.001 |
| Basal cell carcinoma         | 10.1% (19/188) |         |
| Squamous cell carcinoma      | 18.7% (36/193) |         |
| Benign naevus                | 3.9% (4/102)   |         |
| Dysplastic naevus            | 0% (0/20)      |         |
| Seborrheic keratosis         | 5.0% (2/40)    |         |
| Solar keratosis              | 6.7% (19/284)  |         |
| Other                        | 0.8% (1/122)   |         |
| Re-excisions of skin cancers | 42.9% (3/7)    |         |

### PRESENCE OF MEDICAL CONDITION

|     |                |         |
|-----|----------------|---------|
| No  | 7.7% (61/788)  | P=0.015 |
| Yes | 13.9% (23/165) |         |

# Results: Bivariate statistics 2



## Incidence of infection (85/972)

### SMOKING

|                |                       |
|----------------|-----------------------|
| Never          | 7.5% (45/597)         |
| Ex-smoker      | <b>14.3%</b> (31/217) |
| Current smoker | 5.7% (9/157)          |

P=0.017

### LENGTH OF EXCISION

|          |                       |
|----------|-----------------------|
| <=15 mm  | 3.4% (11/322)         |
| 16-20 mm | 3.7% (9/241)          |
| 21-25 mm | <b>14.6%</b> (23/157) |
| >25 mm   | <b>16.7%</b> (42/252) |

P<0.001

### FLAP

|     |                    |
|-----|--------------------|
| No  | 8.6% (83/968)      |
| Yes | <b>50.0%</b> (2/4) |

P=0.002

# Results: Multivariable analysis of independent predictors of infection



## Relative risk of infection

### BODY SITE

|                   |     |         |
|-------------------|-----|---------|
| All other         | 1   |         |
| Upper extremities | 3.2 | P<0.001 |
| Lower extremities | 3.7 | P<0.001 |

### HISTOLOGY

|                            |      |         |
|----------------------------|------|---------|
| All other                  | 1    |         |
| BCC                        | 2.1  | P=0.001 |
| SCC                        | 2.3  | P=0.022 |
| Re-excision of skin cancer | 14.8 | P<0.001 |

### SMOKING STATUS

|                         |     |         |
|-------------------------|-----|---------|
| Never or current smoker | 1   |         |
| Ex-smoker               | 1.7 | P=0.019 |

### LENGTH OF EXCISION

|          |     |         |
|----------|-----|---------|
| <= 20 mm | 1   |         |
| > 20 mm  | 2.4 | P<0.001 |

Model adjusted for age and serious medical condition; statistics adjusted for cluster sampling.

# Discussion: Limitations of study

- **Diagnosis of infection subjective**
- **Surgical training and techniques of GPs**
- **Data on occupation**
- **Generalisability might be limited**

# Discussion:

## Why is our infection rate so high?

- **We do not know!**
- **Tropical climate....**
- **Different patient cohorts: cane farming, mining,....**

# Discussion – Risk factors previously identified



**Body site:** ear, nasal area, auricular area, groin, lower leg

**Histology:** skin cancer, BCC, SCC

**Demographics:** older age, male

**Conditions/Medication:** anticoagulants, immunosuppressants, diabetes

**Procedure:** skin graft

## **Discussion – Antibiotic prophylaxis**

- **Efficacy, antibiotic costs, adverse effects and resistance**
- **Use antibiotic prophylaxis in high risk patients**

# Conclusion

**The present study suggests that patients with:**

**Excisions of skin cancer**

**Excisions on upper or lower limb**

**Larger excisions**

**are at high risk for infection.**

**High risk patients could be considered for antibiotic prophylaxis treatment.**

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