

***Investigation of an increase in surgical site infections
among Orthopaedic and Ophthalmology patients***



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Recognition of an outbreak

April 2008:

Sudden increase in infection rate for 'clean' surgical procedures for orthopaedic patients receiving hip or knee prostheses;

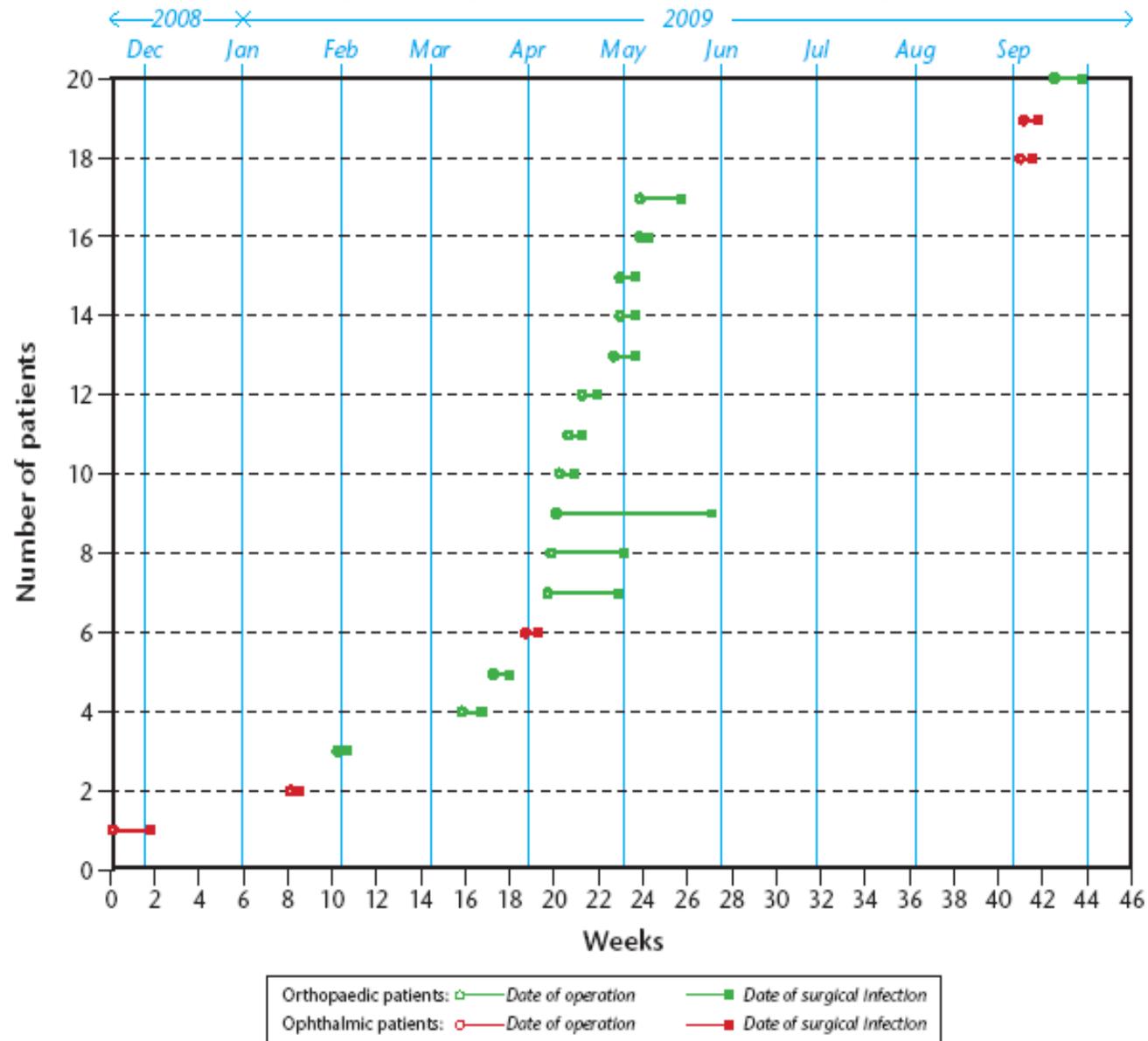
There were also cases of acute endophthalmitis after phacoemulsification surgery at this time



Since our hospital reports such infections promptly for surveillance purposes, a sudden increase in infection rates ought to alert Infection Control staff early;

BUT...there was no obvious 'outbreak' organism, so initial cases did not raise the alarm as they should have done.

Dates of operation and onset of surgical site infection for twenty orthopaedic and ophthalmic patients





Actions taken

Outbreak committee convened!

Review of ward and theatre practices

Epidemiological analyses

Inspection of orthopaedic theatres

Review of microbiological results

Infection control audit, including hand hygiene

Maintenance services for laminar flow

Terminal cleans for orthopaedic wards

Antibiotic prophylaxis changed

Theatres deep cleaned

Increased vigilance for further cases, with additional microbiological investigations



Retrospective investigation
revealed possible missed cases!

Then there was a second surge of
cases because we had failed to
rectify the underlying cause





Orthopaedic patients

Fifteen orthopaedic patients were involved in the outbreak.

Eleven had knee or hip implant surgery (two were revisions).

The remainder were bilateral osteotomies; internal fixation of an ankle fracture; bunion repair with screws; and a fasciotomy with external medullary fixation.

No common microbiological cause was found from submitted specimens (wound swabs, aspirates, tissue, etc.)

Half of the patients required further surgery, e.g. wash-outs; revision, etc.

One patient died.

One patient required two further attempts to replace his knee prosthesis.





Ophthalmology patients

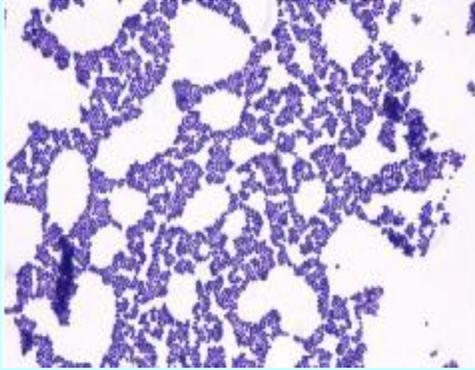
Phacoemulsification, or phaco, is method of cataract surgery in which the internal lens of the eye is emulsified using ultrasonic energy and replaced with an intraocular lens implant.



Five patients who underwent cataract surgery within the outbreak period were diagnosed with post-operative endophthalmitis.

This is potentially devastating for the patient since it can cause permanent blindness.

All five patients required further surgery.



Gram-stain of staph

Initial microbiology results

Orthopaedic specimens

Coagulase negative staphylococci with or without faecal-type flora (different species) and *Bacillus* spp.

Ophthalmology specimens

Coagulase negative staphylococci and *Bacillus* spp. recovered from vitreous humour



***Bacillus* spp. on blood agar**

Two months later: Resurgence of outbreak with two cases of endophthalmitis

Outbreak committee reconvened, with medical director and hospital managers

Theatre staff volunteered concerns over damp and/or stained packs of surgical instruments returning from sterile services provider

Staining was usually orange/brown in colour



We decided to audit damp and/or discoloured packs;

Packs were selected for microbiological examination.

Surgical instruments used for high risk surgery (eyes, orthopaedics and vascular) were sent to another sterile services provider on a temporary basis.

Microbiological examination of surgical sets



Level 1 laminar flow cabinet with Hepa-A filtration in a Category 3 area is disinfected and allowed to run for 30 mins before processing;

Control settle plates positioned within the cabinet

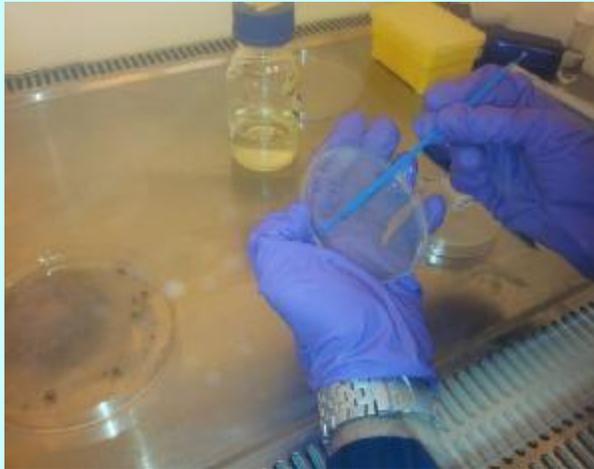
Pack and media bottles cleaned with disinfectant (Trigene) before placing in the cabinet;

Gloved operator removes outer layer of pack;

Sterile gloves replace disposable gloves using aseptic technique

Adapted from Widmer et al, J Hosp Infect 1992; Webster et al, AmJIC 2005

Microbiological sampling of surgical sets



Inner wrapping sampled with moistened sterile swab and broth inoculated;

Wrappings folded back to sample inner box or tray: swabs inoculated into broth;

Instruments sampled on untouched areas only: swabs inoculated into broth

Additional swab inoculated into broth to act as process and sterility control

Settle plates incubated aerobically for 48 hours;

Broths incubated for 5-7 days and sub-cultured if cloudy;

Terminal subcultures performed on clear broths at 7 days

Results discarded if any growth occurred on settle plates

Adapted from Widmer et al, J Hosp Infect 1992; Webster et al, AmJIC 2005

Visual and microbiological findings from 'sterile' surgical packs

Pack type	Visual appearance	Culture wrappings	Culture instruments
Ophthalmic set	Damp; discoloured	CNS	CNS
Cystoscopy set	Damp	NG	<i>Bacillus</i> spp.& CNS
Hysteroscope	Damp; discoloured	NG	<i>Bacillus</i> spp.& CNS
Maxidriver set	Normal	NG	<i>Bacillus</i> spp.& CNS
Maxidriver set	Damp	<i>Bacillus</i> spp.	<i>Bacillus</i> spp.& CNS
Medullary set	Damp	NG	<i>Bacillus</i> spp.
TPS set	Normal	NG	<i>Bacillus</i> sp.
Phacoemulsifier	Normal	NG	CNS
Strabismus set	Discoloured	NG	<i>Bacillus</i> spp.
Phacoemulsifier	Damp; discoloured	NG	<i>Bacillus</i> spp.& CNS
Fasciotomy set	Slightly discoloured	NG	<i>Bacillus</i> spp.

Microbiological results from all 20 patients

Twelve specimens grew CNS, three of which also had faecal-type flora

One specimen grew CNS and *Bacillus* sp.

One specimen grew *Bacillus* sp.

Four specimens grew faecal-type flora only

One specimen grew methicillin-susceptible *Staphylococcus aureus*

There were no microbiological results for one patient

All patients were treated with vancomycin and gentamicin

Six patients had aspirates/tissue sent from subsequent surgical revision:

Three specimens grew CNS alone

One grew *Bacillus* sp.

There was no growth from specimens from two patients

Further actions following microbiological findings

Immediate site visit to the sterile services provider!

We found:

drab and dusty autoclave area, with evidence of poorly maintained fabric;

no wash hand basin facilities within the autoclave area;

no evidence of baffle plates and/or functional indicators in the autoclaves;

sterilised packages were stored on, or just off, the floor;

lack of assurance for adequate drying/cooling of packages;

metal gurneys used to transfer sterilised sets between autoclave and transfer cart were corroded with rust.



Actions agreed by sterile services provider and hospital managers

Sterile services:

Staff training review
Hand hygiene practices
Electronic tracking
Incident reporting process



Hospital:

Monitoring of sterile packs on receipt from provider
Computer based notification of faulty; missing; damaged & wet packs
Surgical site infection surveillance for high-risk specialties

BOTH:

Creation of a governance committee to oversee sterile services
Regular (quarterly meetings)
Review fault notifications and trends
Review new kit; fast track service and overall turnaround times
Actions discussed and agreed

What is the situation now?

The Healthboard Sterile Services Governance Committee continues to meet regularly in order to enhance communication between sterile services, managers and NHS staff.

We review all aspects of procurement, cleaning, sterilisation and repair of surgical instruments used across the Healthboard. In addition, all sterile sets are routinely inspected by a senior theatre nurse on delivery at the theatre complex.

Surgical site infection rates are routinely monitored and have remained within the expected range for Scotland over the last four years

Why were there no cases among vascular graft patients?



Surgical prophylaxis for orthopaedics

CEFUROXIME

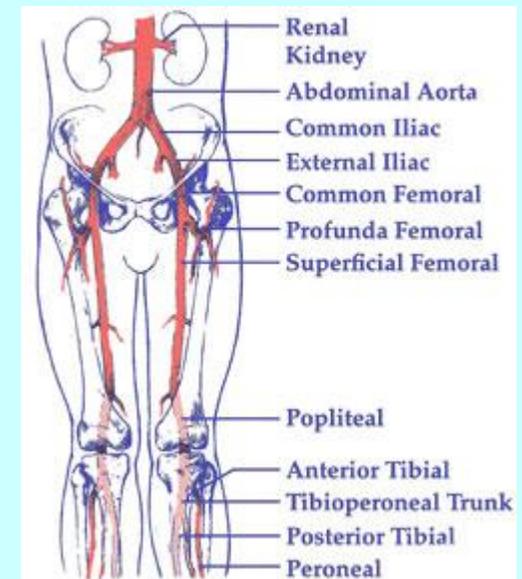


Surgical prophylaxis for cataract surgery

CEFUROXIME

Surgical prophylaxis for vascular surgery

VANCOMYCIN



LANG02 HAIRMYTES

STEAM

STERILE

SURGICOME DRILL

Register Form: HM DAY SURG

Instructions:

Take in a clean dry environment. Before registration date 1 year
to first issue or full 11 package storage
Check for complete seal and integrity before use

Synergy Healthcare
SURGICOME DRILL

S/N: 21052751

P/C: 1008887

Valid: 10/05/2024

Serial Number

Expiry: 23/05/2018



For complete details see the
instructions for use

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Conclusion

This presentation has highlighted the importance of instrument processing by sterile service facilities

Surgical sets should always be carefully inspected on reception. There should be continued close collaboration between decontamination staff, theatre staff and infection control, particularly if sterile services are located off-site.

Faulty processing of reusable surgical instruments results in serious clinical implications for patients

Acknowledgements

We would like to acknowledge the huge amount of work performed by managers, clinicians, infection control, theatre and decontamination staff, some of which continues with regular meetings and audit exercises.

Without support from all the staff involved, we would not have been able to produce the relevant action plans or set up a long-term specialist group to safe-guard future practices.

THANK YOU!

No disclosures

WHY CATS ARE NOT DOCTORS



Doctor loses medical license after
licking self, instruments clean.