Steriwave® Nasal Photo Disinfection Reduces Surgical Site Infections Following Anterior Skull Base Surgery

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Introduction:

Intranasal photodynamic disinfection therapy (PDT) is a novel **nonantibiotic** broad-spectrum antimicrobial technology.

It eliminates intranasal, viruses, fungi and bacteria including MRSA and methicillin-susceptible S. aureus.

NICE guidance recommends preoperative antibiotic nasal decolonisation to reduce Surgical site infections SSI.

Patient compliance may be as little as 40%.

SSI significantly burdens the NHS accounting for 1 in 7 hospital-acquired infections in the UK.

Preoperative prophylactic antibiotic strategies contribute to the global issue of antibiotic resistance.

Methods:

Before and after quality service improvement project utilising Steriwave PDT for preoperative nasal decolonisation.

Inclusion criteria: Consecutive adult patients undergoing endoscopic anterior skull base surgery

Before: Historic consecutive cohort utilising Standard NICE 5-day preoperative nasal mupirocin ointment

After: Prospective cohort utilising additional Steriwave PDT

Primary Outcome:
Surgical site infection within 30 days of surgery

Secondary Outcome:
Meningitis within 30 days of procedure

Data collection: GP and Hospital electronic records and structured telephone review every two weeks prior to first ENT visit.

Surgical site infection, meningitis or sinusitis, defined based upon a pragmatic real-world usage of antibiotic.

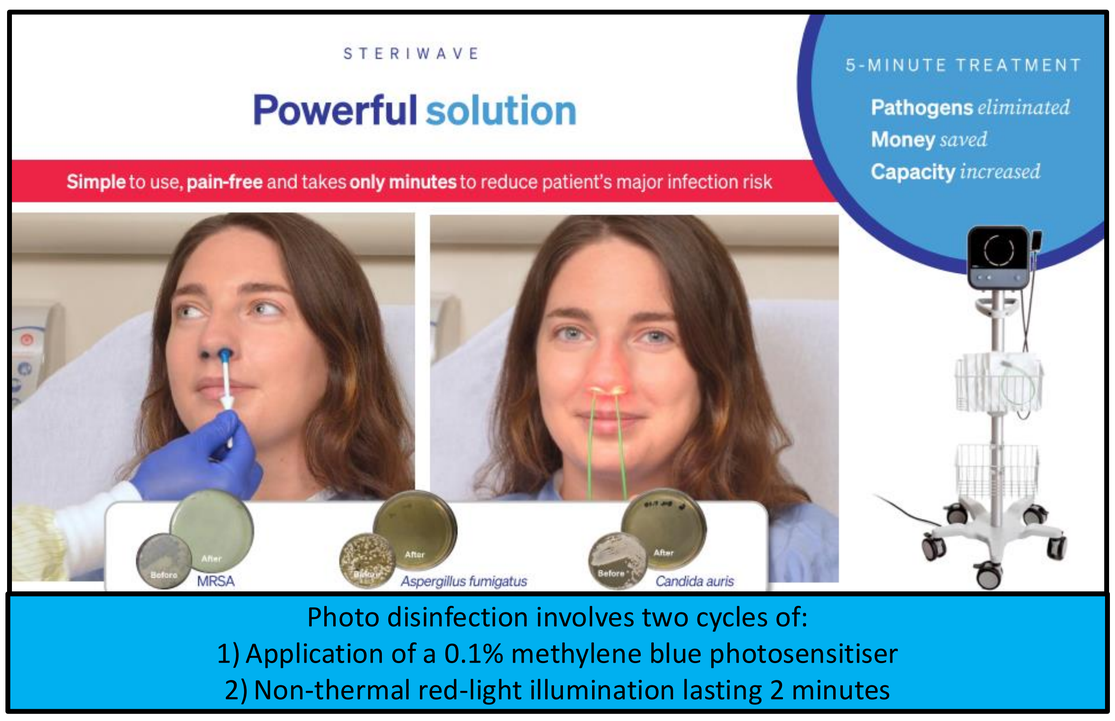
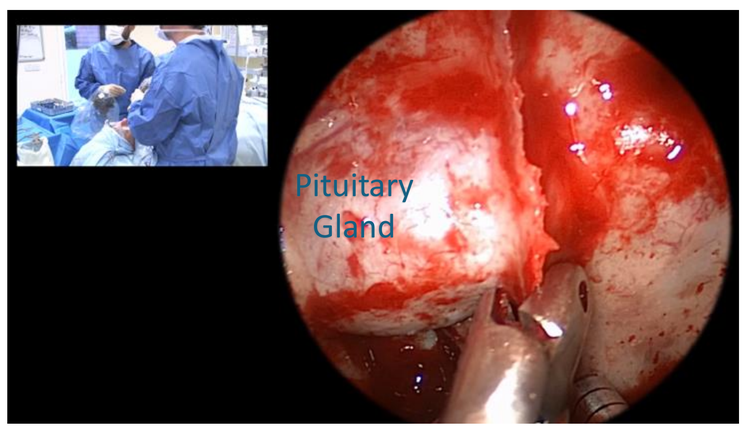


Photo disinfection involves two cycles of:
1) Application of a 0.1% methylene blue photosensitiser
2) Non-thermal red-light illumination lasting 2 minutes

Characteristics	Traditional (n=104)	Steriwave (n=85)
Pituitary based	80 (77%)	65 (76%)
Extended approach*	24 (23%)	20 (24%)
Intra operative CSF	38 (36.5%)	32 (37.6%)
Post Operative CSF	2 (1.9%)	0 (0%)

*Chordoma, Craniopharyngioma, Meningioma, Olfactory neuroblastoma, Meningoencephalocele



Results:

189 patients were included (104 historical controls, 85 Steriwave®). Data available for all patients.

SSI occurred in 17/104 patients (16.3%) in the control cohort compared with 3/85 (3.5%) in the Steriwave® cohort

P<0.01, (RR 0.22, 95% CI 0.07–0.71).

Relative risk reduction 78%, NNT to prevent one SSI was 8.

Mean postoperative ENT outpatient visits were significantly reduced in the Steriwave® cohort.

Outcome	Tradition (n=104)	Steriwave (n=85)	P Value Fishers exact test
SSI	17 (16.3%)	3 (3.5%)	P<0.01
Meningitis	3 (2.9%)	0 (0%)	
ENT OPD visits	1.8	1.1	P<0.01

Discussion:

Immediately nasal decolonisation before surgery eliminates issues related to patient compliance and is suitable for emergency cases.

It is quick and simple with no adverse patient events and high patient satisfaction outcomes.

PDT does not exert selective antimicrobial pressure important in the context of rising antibiotic resistance.

Steriwave cost £68 pounds per patient or £546 per SSI prevented.

Post operative meningitis results in an average of 15 excess post-operative NHS bed days.

Study has several strengths: consecutive patient inclusion, comprehensive capture of antibiotic prescribing across healthcare settings and consistent surgical technique and postoperative protocols delivered by a single experienced multidisciplinary team.

Study limitations; include non-randomised design and use of a historical control cohort, introducing potential temporal confounding. Furthermore, the study was underpowered to formally assess differences in postoperative meningitis rates.

Conclusion:

Preoperative nasal PDT using Steriwave was associated with a clinical and statistically significant reduction in SSI-related antibiotic use following anterior skull base surgery

These findings support further Prospective randomised trials in rhinology and skull base

Leeds Hospitals Charity

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