RANZCO THE LEADERS IN EYE CARE

The Royal Australian and New Zealand College of Ophthalmologists

Guidelines on Toxic Anterior Segment Syndrome

Approved by: Board

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The Royal Australian and New Zealand College of Ophthalmologists
ACN 000 644 404
94-98 Chalmers Street, Surry Hills NSW 2010
Phone: +61 2 9690 1001 Fax: +61 2 9690 1321
www.ranzco.edu

1. Introduction

TASS is an acute sterile postoperative inflammation involving the anterior segment structures which is usually diagnosed 12 to 48 hours after anterior segment surgery. It is principally associated with cataract surgery but has been reported with other anterior segment procedures including keratoplasty. It is believed to be due to the introduction of toxic materials into the eye at the time of surgery however there is a lack of good evidence regarding contributing factors. The condition causes corneal endothelial damage, disruption of the blood-aqueous barrier and varying degrees of damage to the iris and trabecular meshwork.

The care of microsurgical instruments is especially important in the prevention of TASS, in particular the adequate flushing of phaco and I/A handpieces. The following bullet point summary is to highlight key points about TASS. For more detailed educational information, please see the References list provided later in this document.

Ophthalmologists often practice in relative isolation and there is a need for surveillance of this condition to ensure that the significance of isolated cases, which may be part of a wider outbreak, does not go unnoticed. The '*Sample TASS Incident Form*' at Appendix A may be useful as a tool to help record and deduce surgical practices which could have contributed to TASS cases and to facilitate local reporting processes. Members can also use the RANZCO Clinical Audit Tool to monitor cases by recording TASS as a complication resulting from individual cataract procedures.

The general steps that should be followed for managing a TASS incident include:

- Prompt and effective treatment of cases
- Reporting to health facility staff and the appropriate authorities
- Investigation and analysis of the cause
- Reviewing and improving procedures to reduce risk
- Ongoing evaluation/audit of complications and monitoring of procedures.

2. Clinical Features of TASS

- Pain
- Reduced Vision
- Diffuse limbus to limbus corneal oedema
- Anterior segment inflammation often with hypopyon
- Secondary glaucoma

3. Possible Long Term Sequelae

- Persistent corneal oedema requiring keratoplasty
- Dilation or distortion of the pupil with iris atrophy
- Peripheral anterior synechia
- Glaucoma

4. Factors Believed to be Contributory

TASS is believed to be caused by the introduction of toxic materials into the eye at the time of surgery.

Most cases of TASS are caused by inadequate cleaning of microsurgical instruments particularly handpieces.

There is a lack of good evidence in this area, however pertinent factors are believed to include:

- Inadequate time and staff to allow good cleaning and sterilisation practices
- Residual cleaning agents such as enzymic detergents following cleaning/sterilisation procedures
- Contamination of intraocular lenses (IOLs) and instruments with talc or other ‘releasing substances’ used in surgical glove manufacture
- Residual denatured viscoelastics
- The use of lint containing towels during cleaning
- Reuse of single use items
- Use of re-usable cannulas
- Use of tap water for cleaning
- Heat stable bacterial endotoxins from ultrasonic cleaners, water baths or autoclave reservoirs.
- Poor maintenance of surgical tools and cleaning/sterilising equipment
- Inadequate drying of instruments after cleaning
- Heavy metals and their oxides e.g. degraded brass instruments
- Preservatives in intraocular solutions
- Irrigating solutions with inappropriate composition, osmolarity or pH.
- Intracameral anaesthetics of inappropriate concentration or containing preservative

- Intracameral antibiotics
- Inappropriate disinfectant for skin preparation
- Materials used in polishing and sterilising IOLs
- Mitomycin-C
- Cortical lens material
- Use of Povidone Iodine at completion
- Ophthalmic ointment used at completion

5. Differential Diagnosis

- Infectious endophthalmitis

6. Patient Management

- Prevention
- Exclusion of infectious endophthalmitis
- Intense topical steroid
- Anterior segment washout not recommended
- IOP control
- Consider resuming early follow up if not normally undertaken
- Verify that patients are fully aware of post-operative danger symptoms
- Cease bilateral simultaneous cataract surgery where performed

7. Recommended Sterilisation and Surgical Practices

Some key sterilisation and surgical practices are listed below. More detailed recommendations are also explained in '*Recommended Practices for Sterilizing Intraocular Surgical Instruments*' (listed in References);

- Ensure adequate time, staff and instrument sets available for cleaning as per manufacturer's instructions to avoid shortcuts in process
- Track use of instrument sets to assist in identifying TASS source
- Employ 'Multi-pulse' steriliser cycles which properly sterilise and dry lumen containing instruments, and avoid short 'Flash' cycles

- Avoid allowing instruments to dry before cleaning
- Dry instruments after cleaning and use compressed air for instruments with lumens
- Use lint free materials during instrument handling
- Do not re-use single use devices
- Avoid the use of re-usable cannulas
- Ensure no preservative containing solutions are used in surgery
- Use sterile distilled or sterile de-ionised water for cleaning
- Discard cleaning solutions after each use
- Copiously flush handpieces (e.g. by using an automated rinser)
- Replace fluid in ultrasonic baths daily
- Change water in steam autoclave reservoirs weekly
- Comply with 'shelf life' of all materials
- Ensure all solutions are properly prepared and concentrations are accurate
- Use BSS not sterile water to prepare intraocular solutions
- Ensure surgeon and scrub nurses handle IOL's with instruments only and avoid touching the IOL or tips of instruments used in the eye with surgical gloves
- Avoid glutaraldehyde and ethylene oxide
- Validate and maintain sterilisers appropriately
- Do not use ointments at completion

8. Management of an Outbreak

- Treat all cases promptly and vigorously
- Communicate and collaborate openly with the surgical facility and follow any local investigation and reporting procedures
- Ensure colleagues are made aware of a TASS incident (e.g. by global email) to ensure identification and reporting of further cases
- Task a small team to investigate root cause (e.g. consultant ophthalmologist, clinical director, and theatre nurse)
- Examine patient records to ensure prophylaxis protocols were followed and to identify individual risks for TASS
- Record all action taken
- Review all medications and solutions used

- Review all cleaning and sterilisation practices and protocols
- Identify any devices or substances in common if there are multiple cases of TASS - increase suspicion if cases share a common isolate, surgeon, theatre, session, instruments or consumables batch number
- Consider requesting external advice from RANZCO
- Members can use the RANZCO Clinical Audit Tool (RCAT) to monitor cases by recording TASS as a complication resulting from individual cataract procedures
- If the cause relates to a medical device and/or manufacturer's instructions consider prompt reporting to appropriate staff in the health facility, to the supplier of the device and also to the Therapeutic Goods Administration (TGA), see <www.tga.gov.au/reporting-medical-device-problems>.

9. References

1. Mamalis N. Toxic anterior segment syndrome. Journal of Cataract & Refractive Surgery 2006; 32(2):181-2.
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3. Eydelman MB, Tarver ME, Calogero D, Buchen SY, Alexander KY. The Food and Drug Administration's Proactive Toxic Anterior Segment Syndrome Program. Ophthalmology 2012; 119(7):1297-1302.
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6. Cetinkaya S, Dadaci Z, Aksoy H, Acir NO, Yener HI, Kadioglu E. Toxic anterior-segment syndrome (TASS). Clinical Ophthalmology 2014; 8:2065–9.
7. American Society of Cataract and Refractive Surgery and American Society of Ophthalmic Registered Nurses. Recommended practices for sterilizing intraocular surgical instruments. Journal of Cataract & Refractive Surgery 2007; 33:1095-1100.
8. Gopal L, Vijaya L.Toxic anterior segment syndrome [editorial]. British Journal of Ophthalmology 2013; 97(8):953.

10. Record of Amendments

Page	Details of amendment	Date approved
Entire document	Created	23/03/2015

11. Disclaimer

The information set out in these Guidelines is current at the date of first publication and may not remain accurate, current or complete.

The information is not exhaustive and is intended for use as a guide of a general nature only. These Guidelines may or may not be relevant to particular practices, facilities or circumstances given the differences in procedures, activities and accreditation requirements. Whilst the text is primarily directed to ophthalmologists, it is not to be regarded as professional advice and must not be considered a substitute for seeking professional advice. Persons implementing any processes identified in these Guidelines must exercise their own independent skill or judgement or seek appropriate professional advice relevant to their own particular circumstances when doing so. Care and common sense should be exercised in applying the Guidelines to clinical practice.

Compliance with these Guidelines does not guarantee the discharge of any duty of care owed to patients or others coming into contact with the ophthalmologist and the premises from which they operate.

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Appendix A

Sample TASS Incident Form

1. Identifying Details

Ophthalmologist	Name	
	Postal Address	
	Phone	
	e-mail	
Operating Facility	Name	
	Address	
	Contact Person	
	Title	
	Phone	
	e-mail	
Patient Details	Unique Identifier	
	Initials	
	D.O.B	
	Date of surgery	

2. Clinical Information

Immediate Post-operative Clinical Findings	Visual Acuity	
	Degree of inflammation	
	Corneal Appearance	
	Vitreous Findings	
Outcome Describe the clinical course and outcome in detail		
Previous Cases Have you as surgeon or the facility experienced other similar cases? Provide details		

3. Items used during surgery

Was Xylocaine gel used pre-op?	
What antiseptic skin preparation is used pre-op?	
Was this antiseptic used topically at completion?	
Do you use intracameral anaesthetic?	
If so what formulation is used and does it contain preservative?	
Do you use powdered gloves?	
Did you or your scrub nurses handle the IOL or the tips of instruments with gloves?	
Were any single use blades or cannulas re-used?	
Do you use re-usable cannulas or irrigation bulbs?	
Was preserved epinephrine added to the infusion fluid?	
Is it possible that any other preservative containing preparation entered the eye?	
Were antibiotics used in infusion fluid?	
If so what drug, what formulation and what dilution?	
Were all medications used within shelf life?	
Were intracameral antibiotics used at completion?	
If so what formulation and how and with what was the medication diluted?	
Was antibiotic ointment used at completion?	
If so what formulation?	

4. Cleaning and Sterilising Practices

What fluid is used for flushing and rinsing instruments?	Tap Water	
	Sterile Distilled Water	
	Sterile Deionised Water	
	Other	
Are enzymic cleansers used in instrument care?		
If so what formulation is used?		
Is it possible that any detergent products have been used at incorrect concentrations?		
Was an ultrasonic bath used during cleaning?		
If an ultrasonic bath is used how often is the fluid changed?		
Are the instruments cleaned immediately after surgery or allowed to dry?		
What volume of fluid is typically used to flush Phaco and I/A Handpieces?		
Are the handpieces dried with compressed air?		
Are instruments cleaned/dried on lint-free towels?		
Was a 'Flash' sterilisation cycle used?		
Please describe your steriliser and provide the make and model		
How regularly is the steriliser reservoir fluid drained?		