

**Title** FEMTOSECOND LASER ASSISTED CATARACT SURGERY

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**Reference** Technology Review Report – 002/2016, online:  
[http://www.moh.gov.my/index.php/database\\_stores/store\\_view\\_page/30/270](http://www.moh.gov.my/index.php/database_stores/store_view_page/30/270)

#### **Aim**

The objective of this systematic review was to assess the safety, efficacy/effectiveness, economic and organizational implication of femtosecond laser assisted cataract surgery compared to conventional cataract surgery.

#### **Conclusions and results**

##### **Safety**

There was retrievable evidence to suggest that femtosecond laser assisted cataract surgery is as safe as conventional cataract surgery. Among the complications reported include anterior capsule tags, anterior capsule tear, posterior capsule tear, posterior lens dislocation, corneal haze, and macular oedema. Surgical outcomes and safety improved significantly with greater surgeon experience.

##### **Efficacy/Effectiveness**

There was fair level of retrievable evidence to suggest that there was no significant difference in the uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), best corrected visual acuity (BCVA), [Odds ratio (OR), 1.5 (95% Confidence interval (CI): 0.8, 2.9)], and post operative refractive error in the femtosecond laser assisted cataract surgery compared with conventional cataract surgery at all time points. There was also no significant difference in surgically induced astigmatism in the femtosecond laser assisted cataract surgery compared with conventional cataract surgery. The difference in total corneal aberrations, corneal higher order aberrations and corneal lower order aberrations between the two groups was found not to be significant. However, femtosecond laser assisted cataract surgery was associated with significantly lower keratometric astigmatism at 30 and 180 days, significantly lower central endothelial cell loss at seven and 30 days, significantly lower increase of corneal thickness at the incision site at 30 and 180 days postoperatively, better tunnel morphology, significantly lower values of intraocular vertical tilt and internal vertical coma, significantly higher Strehl ratios, significantly better capsulotomy circularity and significantly better intraocular lens centration than the conventional cataract surgery.

There was limited fair level of retrievable evidence to suggest that the effective phacoemulsification time was significantly lower in the femtosecond laser assisted cataract surgery compared with conventional cataract surgery.

#### **Cost /cost-effectiveness**

A single cost-effectiveness analysis conducted in Australia to determine the cost-effectiveness of femtosecond laser assisted cataract surgery as an additional interventional cost for patients with cataract when compared with conventional cataract surgery from a clinical outcome and safety view point reported an ICER of \$92,862 Australian Dollars (AUD)/QALY for femtosecond laser assisted cataract surgery compared with conventional cataract surgery which was considered as not cost-effective. Multivariate sensitivity analysis revealed that femtosecond laser assisted cataract surgery would need to significantly improve visual outcomes and complications rates over PCS, along with a reduction in cost to patient, to improve cost-effectiveness. Modelling a best-case scenario of femtosecond laser assisted cataract surgery with excellent visual outcomes (100%), a significant reduction in complications (0%) and a significantly reduced cost to patient (\$300 AUD) resulted in ICER of \$20,000 AUD/QALY.

#### **Recommendations (if any)**

Femtosecond laser assisted cataract surgery is not recommended since it does not improve clinical outcome and it is very costly.

#### **Methods**

Electronic databases were searched through the Ovid interface: Ovid MEDLINE® in-process and other Non-indexed citations and Ovid MEDLINE® 1946 to present, EBM Reviews - Cochrane Central Register of Controlled Trials - July 2015, EBM Reviews - Cochrane Database of Systematic Reviews - 2005 to June 2015, EBM Reviews - Health Technology Assessment – 3<sup>rd</sup> Quarter 2015, EBM Reviews – NHS Economic Evaluation Database 2<sup>nd</sup> Quarter 2015, and EMBASE. Google was used to search for additional web-based materials and information. No limits were applied. Additional articles were identified from reviewing the references of retrieved articles. Last search was conducted on 6 August 2015.

#### **Further research/reviews required**

The location of femtosecond laser cataract surgery, logistics and training of the surgeons need to be taken into consideration.

#### **Written by**

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