2019 Health Technology Reassessment Report

Safety and Effectiveness Assessment of thermal treatment for obstructive meibomian gland

NECA
한국보건의료연구원

Abstract (English)

□ Assessment background

Thermal treatment for obstructive meibomian gland, which is the technology being assessed, is a procedure used to treat and alleviate symptoms of dry eye syndrome by unblocking the meibomian gland duct by heating from inside the meibomian gland in patients with dry eye syndrome caused by meibomian gland dysfunction or combination of abnormalities involving the meibomian gland and lacrimal gland.

This technology was announced by the name “thermal pulsation treatment for obstructive meibomian gland dysfunction” in the new health technology assessment in 2013 (Ministry of Health and Welfare notification 2014-20, February 6, 2014), but the name was subsequently changed to “thermal treatment for obstructive meibomian gland” by the medical practice professional assessment committee meeting held by the Korean Health Insurance Review and Assessment Service in December 2016 (Ministry of Health and Welfare notification 2017-37, March 1, 2017).

The Ministry of Health and Welfare is in the process of converting 485 technologies that are non-covered items into covered items. This technology has already been assessed as a new health technology among the items to be decided by 2020. Accordingly, evidence update work was performed as a part of the latest health technology reassessment project (Project number: NR19-001, Principal investigator: In-Soon Choi).

□ Committee operation

The subcommittee on thermal treatment for obstructive meibomian gland consisted of five experts from relevant fields [four ophthalmologists and one

evidence-based medical expert (pulmonology)] and a total of four subcommittee sessions were held to assess the safety and effectiveness of this technology.

1) The members participated in all processes from drafting the research protocol, selection of search terms based on PICO format, to establishment and application of selection and exclusion criteria to carry out the assessment by a systematic literature review, while also acting as objective expert advisors. Moreover, the final conclusions were derived during the fourth subcommittee session and was finalized through written advice on the subsequently supplemented final report.

□ Assessment objectives and methods

Thermal treatment for obstructive meibomian gland is a procedure used to treat and alleviate symptoms of dry eye syndrome by unblocking the meibomian gland duct by applying heat and pulsation from inside the meibomian gland in patients with dry eye syndrome caused by meibomian gland dysfunction or combination of abnormalities involving the meibomian gland and lacrimal gland. The safety and effectiveness of this technology were assessed by a systematic literature review as described below.

As the search strategy for articles about thermal treatment for obstructive meibomian gland, the major health outcomes selected consisted of postoperative complications or adverse events, improvement in meibomian gland function, tear break-up time (TBUT), symptom alleviation, and ocular surface staining (OSS) of this procedure applied to patients with dry eye syndrome comorbid with blepharitis or meibomianitis, as compared to conventional treatment methods.

The search for thermal treatment for obstructive meibomian gland used five Korean databases, including KoreaMed, and foreign databases, including

Ovid-MEDLINE, Ovid-EMBASE, and Cochrane Library. Based on a search strategy that combined {(Dry Eye Syndromes.mp. OR exp Dry Eye Syndromes/) OR (Meibomian Glands.mp.) AND (Thermodynamics.mp. or exp Thermodynamics/ AND Thermal Pulsation System treatment.mp.)}, a total of 200 articles were searched, while the following types of studies were excluded: animal studies, pre-clinical trials, non-original studies, studies not published in Korean or English, case studies, case reports, and studies that did not report at least one applicable health outcome. After excluding duplicately searched articles, a total of 142 articles (0 domestic and 142 foreign articles) were identified. After excluding 129 articles based on a full text review, 13 articles were ultimately selected with confirmation from the subcommittee. When classified by study types, there were four randomized clinical trials (RCTs), two non-RCTs, and seven pre-post studies.

All steps, from article search, application of the selection criteria, to data extraction, were performed independently by the subcommittee and two assessors. Risk of bias was assessed using Cochrane's risk of bias for RCTs and RoBANS II for non-RCTs and pre-post studies. The level of evidence was assessed using the GRADE method.

□ Assessment results

<Safety>

The safety of thermal treatment for obstructive meibomian gland was reported in three RCTs (Blackie et al., 2018; Blackie et al., 2016; and Lane et al., 2012) and one pre-post study (Friedland et al. 2011), which was assessed by procedure-related complication, best-corrected visual acuity, discomfort/pain, ocular staining, and intraocular pressure (IOP).

Three RCT reported no severe complications. Among the studies that reported on the safety, the study by Blackie et al. (2016) reported 19 cases of

mild procedure-related complications. The incidence was 5.1% among study subjects corresponding to cross test with the intervention group that received the treatment-related procedure and 7.1% among the control group which received heat therapy. The most common equipment-related complications were discomfort/pain (1.5%) in the intervention group and dermatitis (1.5%) in the control group. The study by Lane et al. (2012) reported that mild complications, such as palpebral pain, vascular infection of the conjunctiva, and burning sensation, improved within four weeks without any drug therapy or sequelae. The percentage of eyes with significant deterioration in best-corrected visual acuity with increase of ≥ 2 lines, as compared to the baseline, was 21.5% in the intervention group and 42.9% in the control group, but the difference was not statistically significant (p=.68). Incidence of discomfort/pain during the treatment was higher in this procedure than heat therapy, but such problem occurred due to the characteristics of the procedure that causes the eye to be irritated from being exposed. However, there were no reported cases of injury to the conjunctiva or cornea. Ocular staining recovered after the procedure or within one day, while both groups showed similar level of decrease in IOP. In this assessment, assessment using GRADE was added. The results showed that the level of evidence was moderate in one article (Lane et al., 2012) that quantitatively reported on safety. The subcommittee opined that thermal treatment for obstructive meibomian gland is a safe procedure since no serious procedure-related complications were reported and even the adverse events that occurred dissipated after the treatment without any other interventions.

<Effectiveness>

The effectiveness of thermal treatment for obstructive meibomian gland was reported in four RCTs (Blackie et al., 2016; Blackie et al., 2018; Finis et al., 2014; and Lane et al., 2012), which was assessed by degree of improvement in meibomian gland function, TBUT, degree of alleviation in dry eye syndrome symptoms, and ocular fluorescence staining score. The results of comparison

with heat therapy during follow-up for an average of three months were as described below.

Improvement in meibomian gland function (MGS)

Thermal treatment for obstructive meibomian gland showed significantly greater improvement in meibomian gland function than heat therapy (7.17, 95%CI [5.57, 8.78]).

Tear break-up time (TBUT)

Thermal treatment for obstructive meibomian gland showed significantly longer TBUT than heat therapy (1.44, 95%CI [0.47, 2.41]).

Symptom improvement (OSDI, SPEED)

Thermal treatment for obstructive meibomian gland showed significantly greater symptom improvement than heat therapy (SPEED: -2.84 95%CI [-4.47, -1.20]; OSDI: -7.33, 95%CI [-10.22 , –4.44]).

Ocular surface staining (OSS)

OSS score was higher with heat therapy than in the intervention group (OSS: 0.89, 95%CI [-1.84, 3.63]), but the difference was not significant.

GRADE results showed that the level of evidence was high for improvement in meibomian gland function (MGS) and symptom improvement (OSDI); moderate for symptom improvement (SPEED) and TBUT; and very low for OSS.

□ Conclusions

Based on such literary evidence, the subcommittee on thermal treatment for obstructive meibomian gland presented the following review results.

Based on such literary evidence, it was determined that although evidence in comparative studies for long-term effects of thermal treatment for obstructive

meibomian gland is insufficient, thermal treatment for obstructive meibomian gland was assessed to be a safe and effective procedure that could improve meibomian gland functions and symptoms in patients with dry eye syndrome comorbid with blepharitis or meibomianitis based on evidence from RCTs.

The Health Technology Reassessment Committee reviewed and determined that the findings of the subcommittee on “safety and effectiveness assessment of thermal treatment for obstructive meibomian gland (technology name)” are valid (September 20, 2019).