



Bruce Larson

Jay Bansal

Ice-cold BSS pre-treatment limits pain of surface ablation procedures

PRE-OPERATIVE topical application of "ice-cold" BSS offers a quick and simple way to control pain after surface ablation procedures, according to refractive surgeons using the technique.

Speaking at the annual ASCRS Symposium on Cataract, IOL and Refractive Surgery, Bruce Larson, MD, innovator of the technique and clinical instructor, Loyola University Medical Center, Maywood, IL, reported results from a prospective study investigating pain scores in patients undergoing epi-LASIK with and without the BSS pre-treatment.

"Surface ablation procedures are making a comeback, but the pain experienced by patients after surgery continues to be a factor limiting their use. Application of 'chilled BSS' post-ablation in PRK, epi-LASIK, and LASEK cases has been described by many surgeons for many years as a method to control postoperative pain and reduce the development of corneal haze. However, our technique using 'semi-frozen' BSS immediately prior to the procedure is unique," said Dr Larson.

Reduced pain scores in comparative study

Dr Larson investigated the efficacy of his technique for reducing pain after epi-LASIK by comparing self-assessed pain ratings in a group of 18 consecutive patients undergoing standard epi-LASIK without the semi-frozen BSS and a subsequent consecutive series of 21 patients who received the ice-cold drops.

During follow-up on the first day after surgery, patients were asked to rate their

pain during the preceding 24 hours using a scale of 0 (none) to 10 (worst pain ever experienced). Patients treated with the semi-frozen BSS had a mean pain score of 1.4, which was significantly lower than the mean score of 4.0 recorded for patients operated on without the semi-frozen BSS.

"Some patients who received the semi-frozen BSS reported no pain at all, and the maximum pain score in that group was a '5', whereas the pain scores ranged from 0 to 10 in the control group," Dr Larson reported.

Dr Larson prepares the semi-frozen BSS by placing the sterile 15ml bottles in the freezer overnight. Just prior to each case, a container is removed and its contents are thawed to about 50% fluid by either rotating the bottle between the hands or placing it in the microwave for a few seconds.

Patients receive (40mg) oral prednisone 30 to 45 minutes prior to the procedure, and after topical anaesthetic drops are instilled, a total of 40 to 50 drops of the semi-frozen BSS is administered at a rate of about one to two drops per second. A stack of approximately 10 4x4 gauze pads is used to catch the excess fluid that runs off on the temporal side of the face and excess fluid from the ocular surface is absorbed with a WeckCel sponge. Then, the epi-LASIK procedure proceeds with application of the epikeratome suction ring, he explained.

"Results from our small formal study and much broader clinical experience demonstrate it is effective for dramatically reducing or even completely preventing postoperative pain, and so we believe its

use can eliminate a major barrier to greater acceptance of surface ablation procedures."

Anecdotal reports support study's findings

High-volume refractive surgeons Jay Bansal MD, and Louis Probst MD, told *EuroTimes* they have incorporated the method into their operative protocols for PRK and have also found it beneficial for reducing postoperative pain.

"The efficacy of this technique for minimising pain after PRK is absolutely incredible. Whereas previously, concern about postoperative pain caused me to hesitate somewhat about recommending a surface ablation procedure, I am now totally comfortable offering PRK to appropriate patients. As more surgeons become aware of this method, I firmly believe it will have an important influence on increasing the volume of surface ablation refractive procedures being performed," said Dr Bansal, who is in private practice in San Francisco.

Dr Bansal allows the frozen BSS bottle to thaw prior to each PRK case for approximately five to seven minutes so that the contents are also about half ice and half liquid. He applies one drop per second for a total of 60 drops and then proceeds to epithelial removal. He also repeats the BSS application once the ablation is finished, just before applying the bandage contact lens.

"It is amazing how little discomfort patients experience after surgery using this technique. While I have not conducted any formal studies analysing pain reports, my impression from routine questioning of patients at their follow-up visits suggests the amount of pain after PRK is equivalent to or even less than that experienced by LASIK patients," Dr Bansal said.

Dr Probst thaws the frozen BSS in the microwave for about 10 seconds prior to using it.

Safety concerns negligible

At the ASCRS session when Dr Larson reported his study, various members of the panel in that session and attendees in the audience raised questions about the potential for adverse consequences

associated with the extremely cold temperature of the drops and the likelihood that the fluid applied was no longer isotonic.

Dr Larson said he presumed the ice-cold BSS contained the same concentration of salts as the original solution. However, to address the concerns that were raised, he asked his hospital laboratory to test the specific gravity and osmolality of both the "early melted fluid" (the liquid present after partial thawing that is applied to the eye) and the "late melted fluid" (the liquid derived from melting of the residual solid in the bottle).

Repeat testing using two bottles of BSS thawed with the same technique used for surgical cases showed the early melted fluid had a higher specific gravity compared with the late melted fluid, 1.006-1.016 g/cc vs. 1.002-1.005 g/cc, respectively. Results from osmolality assays of two other bottles were consistent with those findings in showing that the early melted fluid was more concentrated with a higher osmolality than the late melted fluid (392-423 vs. 174-211, respectively). The fluid from an unfrozen bottle of BSS had an osmolality of 301.

"The findings from those assays were surprising to me, but I don't believe they suggest any safety concerns. While use of a hypotonic solution may be problematic because of the potential to cause epithelial cell swelling and even membrane rupture and cell death, application of a slightly hypertonic solution should not cause any problems," Dr Larson said. Also, by applying the semi-frozen BSS directly to the intact corneal epithelium should reduce any potential for osmotic effects to the deeper layers of the cornea, including the endothelium.

"Furthermore, I have not observed any detrimental effects since introducing my semi-frozen BSS technique for routine use in March, 2005. In fact, based on historical comparisons with my experience prior to that time, I have noticed absolutely no differences in my experience with epithelial flap creation, time to bandage contact lens removal, postoperative corneal appearance, rate of visual recovery, or refractive results, nor have I had to modify my ablation nomogram," Dr Larson emphasised.

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