Signature system provides the ultimate lens removal surgery

Ahmed Assaf, Donald R Nixon

THE WhiteStar Signature System (AMO, USA) enhances ultrasound efficiency during lens removal surgery at low power, flow rate and vacuum parameters, reported researchers at the XXVI Congress of the ESCRS.

“Fusion Fluidics is a major step on the way to ultimate lens removal surgery. The fast visual recovery fulfills the high patient expectations, said Ahmed Assaf MD, Ain Shams University, Cairo, Egypt.

Dr Assaf operated on 50 eyes of 32 patients with N3+ cataracts that he selected based on the Pentacam grading system. All eyes were operated using biaxial microincision cataract surgery (MICS) with a 20-gauge system through a 1.4mm incision. He used the quick chop technique for nucleus disassembly.

Results showed that the fluidics parameters played a crucial role during cataract surgery, especially with bi-axial MICS. The system provided excellent chamber stability and anticipated occlusion breaks by proactively adjusting the vacuum, for a better more stable anterior chamber.

The maximum vacuum was 350 mmHg with an up threshold of 300 mmHg. Up-time was 200-600 ms, depending on the hardness of the nucleus, Dr Assaf said.

The CASE vacuum, or “safe vacuum”, at which the chamber stabilisation environment (CASE) software reduced the vacuum to avoid surge was 280 mmHg and occlusion mode was on. Because of the optimised fluidics settings, phaco could be performed for N3+ cases using minimal ultrasound power of five to 10 per cent, he noted.

Dr Assaf observed less increase of central corneal thickness with better best corrected visual acuity on the first postoperative day. Considering the high patient demands for fast visual rehabilitation after cataract surgery, these newly developed fluidics settings are an improvement upon previous systems, giving the surgeon just what he requires, he said.

In fact, computer-controlled systems are essential to meet today’s needs, concurs Donald R Nixon MD, who compared the Signature system to the Sovereign (AMO) in two consecutive groups of 200 patients, at the Trimed Eye Centre, Barrie, Ontario, Canada.

“The Signature system has a faster central processor than the Sovereign and a faster pump speed. There is a five-fold increase in data sampling (100 ms to 20 ms) and response. All of the parameters are adjusted for “on the fly” and therefore events that occur in that microenvironment at the phaco tip can be dealt with much more effectively. This was apparent in the outcomes,” Dr Nixon said.

In the investigation, one surgeon performed all of the surgeries using the same technique. Dr Nixon evaluated both groups pre-operatively with the Oculus Pentacam Nuclear grading System PNS (Figure 1), which analyses the anterior segment through Scheimpflug technology, yielding high resolution images and both single and 3D reproducible settings, and determines the cataract grade from one to five. Dr Nixon explained that phaco energy is used primarily to emulsify the nucleus and to a lesser extent the epinucleus. It is this area through a dilated pupil that the PNS software in the Pentacam evaluates in an objective and reproducible fashion to determine the cataract grade. It requires less than 10 seconds to perform and can be done during the initial patient visit. This information can be used by the individual surgeon to assess different systems and the Rabinovitch, D, et al. Eur J Ophthalmol 2003; 13:756-758. 2. Sivakumar, P, et al. J Cataract Refract Surg 2004; 30:1864-1870.
techniques
on the same
cataract grade
(Figure 2).
He recorded
the effective
phaco time,
balanced
salt solution
usage, and
needle time
and matched
them to the
nuclear grade
(Figure 3).

The base
setting phaco
parameters
were 20 per
cent power and 20 per cent duty cycle for
Grade 2-3; 50 per cent lower power and 20 per
cent lower duty cycle for Grade 1; and 100 per cent higher power and 20 per cent
greater duty cycle for Grade 4-5 cataracts
(Figures 4 and 5). He evaluated the data
collected for phaco parameters with the
same three sets of grades.

Dr Nixon observed a linear correlation
of effective phaco time to cataract grade, in
both of the phaco systems used. There was
a statistically significant lower effective phaco
time using the Signature system in the Grade
2-3, and 4-5 groups, but not in Grade 1.
There was a statistically significant lower
amount of balanced salt solution used with
the Signature system across the three
groups. There was a statistically significant
lower needle time in the Grade 2-3 and
4-5 groups that did not reach statistical
significance in the Grade 1 group.
The grading of a cataract using the
Pentacam system showed a linear correlation
to the amount of phaco
energy required to remove
it, he observed. Several
parameters used to assess
phaco efficiency suggested
an advantage for the new
AMO WhiteStar Signature,
he noted.
“It seems logical to suggest
that phaco parameters
adjustment of the two ends
of the cataract spectrum may
improve phaco efficiency.
This study, however, only
evaluated longitudinal
phaco power not elliptical
movement allowed by the
new ELLIPS system. There
may be a need to individualise the PNS
software to be surgeon specific, or the need
to adjust the PNS software for different
ethnic populations,” he noted.

Dr Nixon believes that being able to
preoperatively assess the cataract grade may
allow the surgeon to pre-programme the
phaco settings to further improve safety and
efficiency.

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Figure 3

Figure 4

Figure 5

Figure 6

Courtesy of Dr. Don Nixon MD