Double Aspiration/Single Irrigation System for Bimanual Lens Cortex Removal in Cataract Surgery

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ABSTRACT

The authors describe a bimanual double aspiration/single irrigation system (DASIS) for cataract surgery that efficiently and safely performs aspiration of the entire cortex, including subincisional space. DASIS uses standard and common instruments such as an irrigation/aspiration handpiece in one hand and a single-aspiration handpiece in the other, joined with a short silicone tube using a three-way stopcock. DASIS allows access to 360° of the cortex without a hand exchange, reducing wound leakage and maintaining chamber stability.

INTRODUCTION

Bimanual cortical removal was first described by Dardenee1 in 1970, but not widely accepted. Brauweiler2 revived the technique, noting the advantage provided by a mere change of hands in facilitating subincisional cortical removal. Complete cortical removal may be associated with significant complications; even among experienced surgeons, posterior capsule rupture occurs in 1.4% to 3.6% of cases3-6 with 27% to 47%5,7 occurring during irrigation/aspiration (I/A). We developed the double aspiration/single irrigation system (DASIS), which allows for access to the entire cortex without a hand exchange.

TECHNIQUE

For aspiration through the side port, a single aspiration handpiece is connected by a three-way stopcock to the aspiration line of the phaco machine and via a short silicone tube to the aspiration port in the standard I/A handpiece. The irrigation line of the phaco machine is connected to the irrigation port in the standard I/A handpiece (Fig. 1).

Figure 1. Double aspiration/single irrigation system. 1 = single aspiration handpiece; 2 = three-way stopcock; 3 = aspiration line of the phaco machine; 4 = silicone tube that connects the three-way stopcock with the aspiration port of the standard irrigation/aspiration handpiece; 5 = standard irrigation/aspiration handpiece; 6 = irrigation line of the phaco machine.
This device allows aspiration in the side port by a single aspiration handpiece and I/A through the 2.5- to 3.2-mm wide incision using the standard I/A handpiece. Cortical clean-up is done with either hand. Initially, the handpieces are used separately, but with experience with DASIS the handpieces can be used simultaneously (Fig. 2).

We have performed more than 1,000 surgeries with this system, reduced our surgical time, and found more stability of the anterior chamber during the I/A procedure. We also did not find statistically significant differences in terms of intraoperative complications compared with the bimanual I/A system.

**DISCUSSION**

When bimanual I/A uses separate irrigation and aspiration handpieces, accessibility to the entire cortex, especially the subincisional cortex, is not always achieved. Removal of subincisional material often requires switching the I/A instrument from port to port and hand to hand. Various bimanual solutions have been proposed based on different techniques and instrumentation to allow complete cortical removal.  

We developed a system (DASIS) that allows access to 360° of the cortex without a hand exchange. With DASIS, the main incision (2.5 to 3.2 mm) is always occupied by the standard I/A handpiece, reducing wound leakage and maintaining chamber stability to the greatest possible degree. In contrast, with the standard bimanual technique the main incision is occupied by a much thinner cannula leading to wound leakage and chamber instability.

Additionally, hand, instrument, and port exchange are not necessary with the DASIS, leading to greater safety and efficiency. Furthermore, I/A time fluid volume is significantly reduced with a potential reduction in endothelial cell loss. Only a three-way stopcock and a silicone tube are required in addition to the usual instruments, and any phaco machine is adaptable to this system.

We found this technique to be safe and effective in cortex removal, which can be used in both coaxial and bimanual systems during cataract surgery. It may be useful for surgeons who are comfortable with bimanual I/A for routine cortical clean-up.

**REFERENCES**