

## Late IOL Dislocation: Is It Dead Bag Syndrome?

**W**hat triggers late IOL dislocation? Common, well-understood culprits include pseudoexfoliation and other conditions manifesting in zonular weakness and capsular contraction.<sup>1</sup> Now, increasing awareness of the clinical entity known as dead bag syndrome is leading cataract surgeons to reconsider how they diagnose and manage patients with late IOL subluxation.

### Signs and Symptoms

**Clinical signs.** The clinical signs of dead bag syndrome include late IOL dislocation either outside of the capsular bag or an in-the-bag dislocation with a zonular disinsertion, said Samuel Masket, MD, at the Stein Eye Institute in Los Angeles. “In this syndrome, the bag is diaphanous and has no proclivity for typical postoperative proliferation of lens epithelial cells [LECs],” said Dr. Masket, who first coined the name of the condition more than two decades ago. “Rather, it appears inert or dead, leading to its name.”

As the capsular bag degenerates, defects can occur that allow the IOL to penetrate the progressively thinning capsule. Alternatively, the peripheral capsule and zonular fibers degenerate altogether, leading to disinsertion of the bag, said Dr. Masket.

**Patient presentation.** Reviewing his cases of dead bag syndrome at the Jones Eye Clinic in Sioux City, Iowa, Jason J.

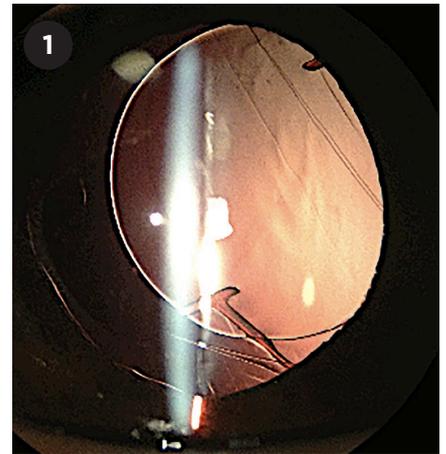
Jones, MD, noted that the original cataract surgeries were normal and routine by all accounts, without any initial complications. “And what’s odd is that, when these cases present, the capsular bags appear extremely clear with no opacification,” he said.

Patients will often note a visual disturbance—a distortion or a loss of vision—because of mild lens decentration, Dr. Jones said. However, dead bag syndrome may not be clinically apparent to the patient. “In a select number of my cases, the lens essentially has a sunset syndrome within the capsular bag,” he said. “But because the lens is not too decentered and the edge of the lens is not yet within the pupil, the patient is unaware of any problem.”

### The Puzzle of Causality

Microscopic evaluation of dead bag syndrome reveals an absence or near absence of LECs with little to no fibroproliferative changes, as well as an absence of posterior capsule opacification (PCO) and no formation of Soemmering ring, said Liliana Werner, MD, PhD, at the John A. Moran Eye Center in Salt Lake City. Instead, the lens capsule appears to have undergone delamination, splitting, and thinning.

Although these histopathologic findings might explain the course of the condition, they do not illuminate the underlying cause of dead bag syndrome, she said. “There are many



**10 YEARS OUT FROM SURGERY.** Three-piece collamer IOL, clear capsule, and disinsertion of the nasal zonular fibers with temporal decentration of the IOL-capsular bag complex, as well as capsule striae from the lens loops, confirming the absence of capsular fibrosis.

unanswered questions not only about the manifestations of this condition, but also in its etiology.”

**Is capsular polishing an issue?** For example, given the scarcity of LECs in the capsules, cataract surgeons have raised the possibility of a causal relationship with capsular polishing, said Dr. Werner. “There has been a lot of emphasis on polishing techniques to prevent capsular bag opacification, especially in association with premium lenses,” she said. “However, even extensive polishing cannot completely remove all LECs, and polishing is usually not performed at the capsular bag equator, as this region is not readily visible.” As such, there is no established association between capsular polishing

BY MIKE MOTT, CONTRIBUTING WRITER, INTERVIEWING JASON J. JONES, MD, SAMUEL MASKET, MD, AND LILIANA WERNER, MD, PHD.

and dead bag syndrome, she said.

Dr. Masket concurred. Although observers have raised the concern that the deliberate removal of anterior subcapsular LECs may be responsible for the dead bag, it's an unlikely cause as many cases are reported prior to the practice of this technique, he said. "Recently, for example, a patient was referred to our practice with a dislocated IOL due to a dead bag in an eye that had cataract surgery under my care 30 years earlier when removal of LECs was not the norm," said Dr. Masket.

**Does IOL type matter?** Dead bag syndrome also does not appear to have any association with IOL design or material, said Dr. Jones. "We've had cases that span different IOLs, different manufacturers, different designs, and different materials, so we know it's not a lens problem," he said. "In fact, all of the lenses we've seen—one-piece or three-piece, hydrophobic acrylic or silicone—appear very normal, without anything unusual about them."

**No comorbidities.** Eyes with a dead bag also appear to have no associated ocular comorbidities, said Dr. Masket—and the condition has been noted throughout the world. "Some of the dead bag cases originally presented for cataract surgery with intumescent white cataracts," Dr. Masket said, "and I've theorized that the fluid imbibed by the lens induced a possible oncotic LEC death. However, these cases were the exception rather than the rule."

Whether some type of programmed noninflammatory cell death or some aspect of the cataract surgery is contributory, ophthalmologists don't yet have the answer, said Dr. Masket. "It's one of those conditions that we know had to exist earlier. So, is there something in our surgeries over the last 15, 20, or 25 years that may have produced it? Intracameral anesthetics? Intracameral antibiotics? We just don't know."

**Other missing links.** Ideally, clinicians would be able to recognize a patient in the early post-op period who will ultimately develop dead bag syndrome several years down the road, said Dr. Masket. However, that type of linear analysis is currently lacking. "Among the biggest conundrums is whether,

in the involved eye, the capsular bag behaves in a typical postoperative manner early after surgery only to have the LECs degenerate over time, or whether the capsule acts in the manner of a dead bag initially and forever after surgery," he said.

But without patient chronologies, the natural history of dead bag syndrome will remain a mystery, said Dr. Jones. "We only know it exists when we see a case that has progressed," he said. "We don't know what the dead bag looked like five or six years ago."

And part of that is simply because of the successes of modern cataract surgery. "Nowadays, we perform the surgery, the patient sees well, and then they're off into the wild blue yonder," said Dr. Jones. He added, "We don't always have intense, sporadic follow-up until patients report a problem. And oftentimes patients with dead bag syndrome aren't even aware of the problem until their ophthalmologist inadvertently decides to dilate their pupil and take a look."

### Management Considerations

At the moment, dead bag syndrome appears to be relatively uncommon, said Dr. Werner. However, those practices managing a significant number of dislocated IOLs may regularly encounter cases. And looking ahead, occurrence rates may increase with the longer life span of the general population and as more young people choose cataract surgery to address refractive issues.

If IOL dislocation does occur, initial surgical management can include a vitrectomy first to prevent any tugging on the retina when the lens is manipulated. Based on the lens type and eye anatomy, the dislocation can then be addressed by either IOL rescue and repositioning or IOL exchange, said Dr. Jones. But because there are so many unanswered questions regarding etiology and manifestation, management of dead bag syndrome should be made on a case-by-case basis, depending on presentation as well as the status of zonular support.

"What makes this syndrome both so fascinating and shocking is that the hallmark of performing cataract

surgery and treating pseudophakia is in-the-bag capsular fixation," said Dr. Jones. "With multifocal lenses in particular, we've come to expect and rely upon the ability to have that long-term, stable capsular fixation." However, when dead bag syndrome is diagnosed with IOL decentration or dislocation, it is preferable to abandon the use of the capsular bag altogether—especially when it's not healthy enough to house an IOL—and look to iris or scleral fixation for an alternative fixation technique, he said.

### Additional Research Needed

If the dead bag mystery is to be solved, more research is essential. Following publication of their landmark study last year,<sup>2</sup> Drs. Masket, Jones, and Werner have received specimens related to dead bag syndrome that will be analyzed at Dr. Werner's University of Utah lab. In addition, the authors have entered into collaboration with a research team in Japan that will perform further immunohistochemical evaluation of the original study specimens.

"By continuing to evaluate these samples, we hope to get a better understanding of the full spectrum of dead bag cases," Dr. Werner said, "as it's quite possible that the findings in our study may represent the most severe end."

1 Kristianslund O et al. *J Cataract Refract Surg*. 2021;47(7):942-954.

2 Culp C et al. *J Cataract Refract Surg*. 2022;48(2):177-184.

Dr. Masket is in practice at Advanced Vision Care in Los Angeles and is clinical professor of ophthalmology at the Stein Eye Institute, University of California, Los Angeles. *Relevant financial disclosures: None.*

Dr. Jones is the medical director of Jones Eye Clinic in Sioux City, Iowa. *Relevant financial disclosures: None.*

Dr. Werner is professor of ophthalmology and visual sciences and codirector of the Intermountain Ocular Research Center at the John A. Moran Eye Center in Salt Lake City. *Relevant financial disclosures: None.*

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