Cataracts

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KEYWORDS

• Cataracts • Intraocular lens implant • Surgery • Management • Cataract symptoms

KEY POINTS

- A cataract is the term used to describe the opacification of the crystalline lens inside the eye.
- Primary care providers play a key role in diagnosing cataracts based on symptoms and known risk factors.
- Cataract surgery is one of the most successful of all surgical procedures performed.
- There are currently no medical treatment for cataracts, however, minimizing exposure to known risk factors can slow progression.

INTRODUCTION

A cataract is a clouding of the crystalline lens inside the eye, which leads to a decrease in vision. It is the most prevalent, treatable cause of visual impairment and blindness in the world. Cataract surgery with an intraocular lens (IOL) implant is one of the most common and thought to be the most effective surgical procedure in any field of medicine. Although aging is the most common cause, other factors, including disease, trauma, medications, and genetic predisposition, are also known to be associated with cataract formation.[1] Although cataracts, and the subsequent surgery to correct them, are ultimately the domain of ophthalmology, the primary care physician is frequently the one to whom patients present with vision complaints. Knowledge of cataract symptoms, how to evaluate them, and a basic understanding of the surgery to correct cataracts make primary care physicians an integral part of treating this leading cause of preventable blindness.

Cataract Surgery: A Brief History

Cataract surgery today is defined as the removal of the opacified lens and replacement with a synthetic lens known as an IOL. Up until the 1960s and later, the cataract was simply removed without a replacement. Although the potential of vision was restored, the resulting lack of a lens, or aphakia, resulted in a significant hyperopia caused by the absence of the lens' focusing power. Thus, in order to have focused vision it was

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Prim Care Clin Office Pract 42 (2015) 409–423
http://dx.doi.org/10.1016/j.pop.2015.05.012 **primarycare.theclinics.com**
0095-4543/15/$ – see front matter

necessary to wear very thick, heavy glasses. These glasses were inconvenient, unsightly, and induced a lot of prism caused by the thickness of the glass lenses. In 1949 a British ophthalmologist by the name of Harold Ridley noticed that plastic fragments from the cockpit canopies of fighter jets were well tolerated in the anterior chambers of the pilots who had been shot down. The idea was born of replacing the lens with a plastic one after the cataract was removed. In the decades since Dr Ridley's idea, IOLs have evolved in design, style, and material. Most modern IOLs are made of either acrylic or silicone. Current IOLs come in a spectrum of diopter powers. The biggest advantage to cataract surgery is that, in addition to restoring clarity to the eye by removing the cataract, the IOL placed can be optimized to correct much of a patient's refractive error. Thus, even patients who were strongly nearsighted or farsighted before cataract surgery will often have no to minimal correction required after, as the IOL is now correcting that error. The determination of IOL power is made by taking various measurements of the eye, specifically the axial length (the distance from the front of the cornea to fovea) and the curvature of the cornea, and then using regression formulas to calculate a power. Newer formulas also use anterior chamber depth, lens thickness, and corneal diameter to provide even more accurate results and, thus, a better chance of achieving emmetropia.

Prevalence and Epidemiology

Approximately 90% of blindness in developed countries can be attributed to cataracts. Prevalence of cataracts varies by age, race, and sex. In the United States, among the nursing home population, cataracts are a leading cause of low vision (as defined by visual acuity worse than 20/40 in the better-seeing eye), responsible for 37% of low vision among Caucasians and 54% of low vision among African Americans.[2] Among Americans, a visually significant cataract (visual acuity <20/40) is present in approximately 2.5% of those aged 40 to 49 years, 6.8% of those aged 50 to 59 years, 20.0% of those aged 60 to 69 years, 42.8% of those aged 70 to 79 years, and 68.3% of those aged greater than 80 years. The 3 subtypes of age-related cataracts (nuclear, cortical, and posterior subcapsular [PSC]) vary across populations. The term *nuclear cataract* describes the normal yellowing and sclerosis of the lens nucleus associated with aging. Cortical cataracts are wedge-shaped or spokelike opacities in the outer cortical layers of the lens. PSCs are plaquelike opacities along the posterior cortical layers. In the United States, nuclear cataracts are seen more commonly in Caucasians, whereas cortical cataracts are seen more commonly in African Americans; however, PSC cataracts are prevalent at roughly the same rate in both groups. Age-related cataracts may be further classified by the Lens Opacities Classification System III (LOCS III). This system, used at the slit lamp, grades the type and density of cataracts by comparing them with standard photographic color plates. Although LOCS III is a very accurate and reproducible way to grade the severity of cataracts, it is primarily used for research purposes to evaluate progression.[3] Cataracts affect nearly 22 million Americans aged 40 years and older. By 80 years of age, more than half of all Americans have cataracts. Direct medical costs for cataract treatment are estimated at $6.8 billion annually.[4] The prevalence of cataracts has a strong positive relationship with age.

ANATOMY AND PATHOLOGY

The lens is a transparent biconvex disk that sits behind the iris inside the eye (**Fig. 1**). The functions of the lens are to

1. Maintain its own clarity
2. Focus light
3. Provide accommodation