When to Treat Congenital Esotropia

Panelists: David G. Morrison, MD; Bruce Schnall, MD; William O. Young, MD

Nelson: We’re going to discuss when to treat congenital esotropia. A 6-month-old child comes into your office with an esotropia of 65 prism diopters, alternate fixation, and a cycloplegic refraction of +2.50. Dr. Morrison, what is your treatment plan?

Morrison: A child who’s clearly alternating fixation has a large angle of deviation that I assume to be an infantile strabismus. My cutoff for prescribing glasses would be +2.50 or +3.00. I would consider trying glasses if the child had any accommodative component and certainly if there was a significant near-distance disparity, but routinely this is a child who would progress to surgery.

When you discuss surgical correction of infantile esotropia there are two issues that have generated argument in the past. One is whether you should proceed with early surgery to improve long-term stereopsis potential. The second issue is the stability of the strabismus angle. If you observe a child with infantile strabismus over time, many times the angle will slightly increase, which may be associated with some contraction of the medial rectus muscle. Some have argued waiting until the strabismic angle is stable before proceeding with surgery.

My current practice pattern would be to schedule that child for surgery. With a deviation of 65 or less, I would do a bilateral medial rectus recession. I would not do a lateral rectus resection with an angle of 65 in a child younger than 2 years. I would see the child again a week prior to surgery. If the angle was stable or within 10 prism diopters, especially if it was increasing slightly, I would proceed with my regular surgery. If I felt that the angle was significantly less, I would delay the surgery for an additional set of measurements to be sure that the angle is stable.

Nelson: Dr. Young, same question.

Young: My approach would be similar. I do think you need two examinations to make sure that the alignment is stable. It’s been my experience that some of these children get better. If they come to our office at 3 months of age with a 30-prism diopter esotropia, it’s not terribly uncommon for that angle to be smaller and occasionally zero when they return a few months later. So we do need to make sure the alignment is stable, and the Congenital Esotropia Observational Study (CEOS) showed that we need to proceed with caution for the smaller angles. If the angle is 40 prism diopters or more, the CEOS showed that it’s unlikely to get better on its own. I agree with Dr. Morrison that if the hyperopia is 3 prism diopters or less, glasses for the hyperopia are unlikely to reduce the esotropia significantly. So I would also operate if the angle was stable with two consecutive examinations a month or more apart.

Nelson: Dr. Schnall, same question.

Schnall: In the congenital esotropia observational study, the largest esotropia they observed to resolve without treatment was 45 diopters. Therefore, you can be fairly confident that this patient’s large esotropia is not going to resolve without surgical treatment. I agree with examining the child a second time and I think you also...
want to make sure there are no other medical issues that would complicate anesthesia at this age. I would perform a large bimedial recession.

Nelson: What hyperopic correction would perhaps sway you to give glasses first?

Schnall: I think there are two things to consider. The first is the variability of the esotropia. If you have an accommodative component, that deviation is going to be more variable. The second is the amount of hyperopia and as a standard I use 3 diopters. If the deviation is large and constant, it’s unlikely to change with hyperopic correction.

Nelson: If any of you were to give glasses, suppose the child comes back within a month and the esotropia is exactly the same with the glasses on. How do you then proceed?

Schnall: If it’s exactly the same, I would proceed with surgery. If the glasses did make a large difference, for example reducing the esotropia from 65 to 40 prism diopters, my first step would be to repeat my refraction to make certain that there was no other significant hyperopia I was not uncovering. If I found a similar amount of hypertropia on my repeat refraction, I’d operate for the portion of the esotropia that was not corrected by the glasses, the same as we do in older children with a mixed mechanism esotropia.

Nelson: Dr. Young, how would you treat that child?

Young: If there’s only a small reduction in the esotropia and this child starts with 65 prism diopters and comes back with 60 prism diopters, I’m going to take the glasses off and proceed with surgery.

Nelson: Dr. Morrison?

Morrison: I agree. As long as there’s not a significant change with the refractive correction, then I don’t want to burden the child and the family with eyeglasses that are not significantly improving the angle of deviation. So I would take the child out of the glasses and proceed with surgery.

Nelson: Let’s assume that all of you have given glasses because the hyperopic correction was large enough and you’re now going to proceed with surgery. Are you going to tell the parents to discontinue the glasses?

Schnall: If the glasses did not significantly reduce the esotropia, I would discontinue them. However, I would warn the parents that even if the glasses are not needed immediately after the surgery, there’s probably a 50% chance the child will eventually need the glasses at some point.

Nelson: Dr. Young?

Young: I agree. I also tell them to put the glasses in the drawer as opposed to getting rid of them altogether. The child may well have outgrown that frame by the time he needs them, but it’s not at all uncommon for these children to develop a recurrence of their esotropia and 3 diopters, which wouldn’t put a dent in the 65 prism diopter esotropia, may be just what the child needs for a 15 to 20 prism diopter recurrence.

Nelson: Dr. Morrison?

Morrison: If the child has significant refractive error, even if there was not a large change in the angle that I measured, I would like to keep the child in the glasses after surgery. If it was a modest refractive error in the +3 range or certainly below, I would tell the parents to hold onto the glasses and do as the other two physicians had mentioned.

Nelson: Let’s assume this child came back at his 2-month follow-up and now has an esotropia of 15 prism diopters. What would be your treatment plan?

Schnall: If amblyopia were present, I would treat it. At the same time, I would repeat my cycloplegic refraction and I would prescribe glasses if significant hyperopia was found. My threshold for prescribing glasses would be lower. In this case, prescribing glasses for 2 diopters or greater of hyperopia. If that did not result in a strabismus angle that would allow for fusion, then I would consider further surgery.

Nelson: So +2 or so would be a reason for you to operate?

Schnall: Correct. If the esotropia were variable, I would consider prescribing glasses even if the hyperopia was less than +2. Maybe there’s a high AC/A ratio.

Nelson: Dr. Young?

Young: I agree, but my decision would be affected by what I observe in the office with and without the glasses on. I would certainly put the child back in glasses if there’s a measurable difference in the alignment. If there’s not, it doesn’t guarantee that there won’t be a month or two later.

Nelson: In a child you did not give glasses to, how would you treat that esotropia of 15 prism diopters?

Young: Absolutely put him in glasses with a full cycloplegic refraction of +2.50 or more.

Nelson: And below +2.50?

Young: I would put him in trial frames in the office, put +2 on, and see what happened. If there’s no difference, I would probably not prescribe the +2.

Nelson: Dr. Morrison?

Morrison: I think there are
two portions to that question. The first is does the child now have an accommodative component? If I felt that was the case and my numbers would be around the +2 cutoff for refractive error, I would certainly try the child in glasses. In the event that I cyclopleged the child at that appointment and found that he has plano refraction or a +1, the question then in my mind is do I want to do a second procedure to increase the child’s potential for stereopsis later? Most children who have an infantile strabismus have relatively low potential for high level fusion later. So I would take several things into consideration in deciding whether to reoperate for a relatively small angle deviation of 15 prism diopters.

Fifteen prism diopters is borderline and probably a little larger than where the child would be able to have peripheral fusion and a monofixation syndrome, so there would theoretically be some benefit to a reoperation if you felt that the child had any fusional potential. However, many children with infantile strabismus have an angle Kappa, and if you put them exactly ortho they look a little exotropic and the family might find that cosmetically objectionable. So I would take into consideration both the family’s perception of the child’s alignment and my own opinion of his potential for fusion in the future. If I decided to reoperate, I certainly would not re-recess the muscle more than 1.5 mm past the equator, which is probably what I would have done on the initial surgery (approximately 6 or 6.5 mm recession), and so I would pick up the lateral rectus to resect.

Nelson: And what is your lower level for giving hyperopic correction?

Morrison: That would be +2.

Young: Would your answer be affected by the age of the child? You operated on a 6 month old and he comes back at 8 months old with 15 prism diopters. If this child is 3 or 4 years old, my number is much lower, perhaps 1.5 diopters.

Morrison: I agree there is some variability to the decision making and I think that may be more obvious in an older child who has a high AC/A ratio or was easier to measure both near and distance than a 15 month old. If I have a child who’s 3 to 4 years old who has a history of an infantile strabismus and now is breaking down what is clearly a greater amount of deviation at near, I would give any cycloplegic refraction that I found in addition to a bifocal and that would certainly change my position.

Nelson: Dr. Schnall, you mentioned that you would have given a low hyperopic correction.

Schnall: If there’s variability or evidence of a high AC/A ratio.

Nelson: Let’s go on to the next case. A 6-month-old child has a large esotropia of 65 prism diopters, alternate fixation, and a cycloplegic refraction of +1 with +2 overacting inferior oblique muscles in each eye. You have determined that surgical correction for the esotropia needs to be done. Dr. Morrison, how would you handle this case?

Morrison: I would approach a 2 or 4 year old, by operating on the inferior obliques. My preferred procedure would be anteriorization of the inferior obliques. If the inferior obliques were overacting similarly, I would place both inferior obliques at the level of the insertion of the inferior rectus muscle. If a DVD was larger in one eye than the other or if the inferior oblique overaction was greater in one eye than the other, I would anteriorize the inferior oblique in the more overacting eye, 1 to 2 mm in front of the insertion of the inferior rectus muscle.

Nelson: Dr. Young, same question.

Young: If this child has 2+ inferior oblique overaction at 6 months of age, it’s not going away. I think it often gets worse and the child is going to have marked inferior oblique overaction with or without DVD 2 years from now. I think the right thing to do is op-
erate on the inferior oblique now. An anteriorization to the level of the inferior rectus insertion eliminates inferior oblique overaction and would also be appropriate treatment for the DVDs that so commonly occur later in children who had congenital esotropia.

Nelson: So two of you would do inferior oblique anterior transpositions and Dr. Morrison mentioned a recession.

Morrison: Without an active DVD, I would not primarily put the inferior obliques at the zero station in a patient with an anterior transposition. There could be potential for the anti-elevation syndrome in the future. I think that the other two ophthalmologists are saying that they’re prophylaxing against DVD if they’re not finding one now and I don’t find that necessary.

Schnall: Most people believe the anti-elevation syndrome is related to the placement of the temporal edge of the inferior oblique. I think you can do the surgery safely and avoid the anti-elevation syndrome if you do not spread the inferior oblique temporally, by keeping the temporal edge of the inferior oblique close to the temporal edge of the insertion of the inferior rectus muscle.

Nelson: Let’s assume the patient did come back a year later and now has DVD. What are you going to do then?

Morrison: It would depend on whether the DVD was associated with continued residual inferior oblique overaction from the primary surgery or whether it was a new-onset DVD. If the child does not have continued inferior oblique overaction, advancing a recessed inferior oblique to zero station or a +1 or +2 station is not going to do any good. At that point, I would recess the superior rectus muscles.

Nelson: Are you concerned at all about recessing superior rectus muscles in the setting of the inferior oblique surgery you perform?

Morrison: I think that it’s worrisome to some extent to weaken both inferior elevators in that circumstance, so I wouldn’t necessarily hang the muscle back as far as I could get. But I have not had difficulty with inability to elevate the eye.

Nelson: How far back will you tend to recess the superior rectus muscles?

Morrison: Somewhere between 6 and 8 mm.

Nelson: Let’s go over the factors that you believe are necessary for success in the long-term surgical treatment of congenital esotropia. Dr. Young?

Young: I think we need to consider the potential for binocularity and whether we might be able to achieve better binocularity with earlier surgery. So we look at the age at which surgery is done. Is 6 months early enough or should we consider doing surgery earlier? Together with that, consider the anesthesia risk. At 6 months of age, we’re on the flatter part of the anesthesia risk curve than at 3 months of age. Surgery at 3 months of age is safer now than it was 20 years ago, and yet the risk is higher at 3 months than 6 months. We also need to consider other health problems the child may have and finally the parents’ wishes. We can present them with all of the data we have, but ultimately they decide whether to proceed with surgery.

Nelson: Dr. Morrison?

Morrison: I think the better binocularity, stereopsis, and fusion that a child has, the better long-term result is going to occur. Interestingly enough, I think that infantile strabismus is one of the most challenging areas to treat because so many have poor stereopsis long-term and new deviations arise. I think counseling families that something new will likely occur before the fifth birthday (and probably even sooner) is important for them to have realistic expectations for their children. However, in maximizing success, I think there’s some good evidence generated by Fawcett and also by Birch that critical stereopsis development is somewhere between 4 and 6 months of age and as a result proceeding with surgery as early as is safe with a reproducible alignment is important.

Nelson: Dr. Schnall?

Schnall: First we should recognize that up to 20% of these children may have amblyopia. Treating amblyopia prior to surgery will improve the child’s chances of developing binocular vision. My goal with surgery would be to have the child’s eyes aligned by 1 year of age and that may involve starting well before 1 year of age. The child can develop illness, which delays anesthesia. In addition, a second procedure may be needed. Once the surgery has been completed, we can maximize the result by taking care of the problems that may occur. We have to be vigilant and recognize that the risk of amblyopia is increased after surgery for infantile esotropia. We should look for the onset of an accommodative component and treat it if present. By observing the child carefully and informing the parents of the need for close observation, we can maximize the surgical result.

Nelson: You all mentioned
age, and yet if you look at the literature there are those who say that the long-term surgical success and development of some degree of stereopsis are similar when operating on a patient at 4 or 7 months of age. Dr. Young brought up the concern that perhaps there is greater risk operating on that patient at 6 months of age. Is there something besides age you all think is important?

Schnall: It’s not the age of the child at the time of surgery, but the duration of the strabismus. Malcolm Ing looked at age at surgery and the development of stereopsis, and some of the older patients he operated on ended up with the highest grade of stereopsis. Patients whose eyes are aligned within a year of the onset of their esotropia have the best chance to obtain stereopsis.

Nelson: Dr. Young, do you agree with that?

Young: I do, except I interpret it as ideally 3 to 4 months after onset.

Nelson: Dr. Morrison?

Morrison: I agree. I think that earlier surgery for an infantile strabismus is associated with the best chance of long-term stereopsis. Evidence has shown that if a constant deviation is present between 3 and 4 months of age that having the best chance for stereopsis is associated with surgery within 3 to 4 months of that time.

Nelson: I’d like to thank everybody for participating.

This Eye to Eye session was conducted on Thursday, April 15, 2010, during the annual meeting of the American Association for Pediatric Ophthalmology & Strabismus.

Drs. Young, Morrison, Schnall, and Nelson have no financial or proprietary interests in the materials presented herein.

doi: 10.3928/01913913-20100916-01