Neonatal Care for Ichthyosis or Epidermal Differentiation Disorders

CME Series on Epidermal Differentiation Disorders — Presented by Dr. Jinia El-Feghaly

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Welcome to Neonatal Care for Ichthyosis or Epidermal Differentiation Disorders, part of First's CME series on EDDs or ichthyosis. Presenting this topic is Dr. Jinia El-Feghaly. Dr. El-Feghaly is chief of pediatric dermatology at Golisano Children's Hospital, part of the University of Rochester Medical Center.

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She is also an adjunct assistant professor at the American University of Beirut.

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She cares for infants and children with complex genetic skin conditions, including ichthyosis, or EDDs And has published on the acute management of newborns with collodion membrane.

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Today we are going to discuss neonatal care for newborns who have suspected ichthyosis or epidermal differentiation disorders, also known as EDDs. Thank you for joining this talk. And let's go. I have no relevant financial relationships to disclose for the stock. What are the learning objectives of our talk today? Identify neonatal period risks that are specific to infants with EDDs including infection, temperature regulation and skin barrier compromise.

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Implement appropriate acute management for a neonate with a suspected EDD and support the family throughout the journey of neonatal care for a suspected EDD. Please do not reproduce these images.

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Recently, a multidisciplinary group of experts in EDDs or epidermal differentiation disorders met to try to build a consensus based, standardized guideline for patients who have epidermal differentiation disorders, particularly for the acute management and the newborn at time. And in the next slides, we are going to go over all these details, particularly over the risks that are associated with this neonatal period, as well as what we can do as dermatologists and pediatric dermatologists to support these kids and also to support their families.

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What is a baby with congenital ichthyosis, or EDD? A baby born with congenital ichthyosis, or EDD, is a baby who has a rare genetic skin disorder. Congenital ichthyosis, present with scaling, with erythema and a very profound skin barrier dysfunction. What is affecting the skin barrier dysfunction is based on the specific genotype of the patient, and it's very important to recognize what that means at the clinical level.

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Therefore, early recognition is vital and crucial. The collodion membrane is something that we've heard about or we've talked about and we've learned about in our books. Babies who are born with a collodion membrane have a very tight, shiny, translucent, parchment like skin layer that encases their skin when they are born and as a result, they will get ectropion, eclabium,

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sometimes also restricted chest movement, severe fluid loss and potentially they would be at risk for systemic sepsis or infection. So this neonatal period is a very high risk time for these babies. And it frequently mandates immediate NICU admission and urgent dermatologic consultation.

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us, many of us as dermatologists, whether we are pediatric dermatologists or adult trained dermatologists we encounter in our institutions consultations of that sort.

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It is important for us to be able to identify these risks, make this diagnosis and know who to talk to, who to reach out to for help, and where to find the answers that we need. And that's why we are here to talk about this topic today.

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As dermatologists, we recognize that the skin has multiple functions. Of these functions, babies who are born with congenital ichthyosis might suffer from a dysfunction in these functions. The first one being the temperature dysregulation. The second one being the ability to move the different organs of the body, not only the chest, but as you can see in this picture, also the digits and the extremities.

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Sometimes these kids can get constrictions on their fingers and their toes because of how tight the collodion membrane is. These kids might also have dysregulation in the water loss of their skin. Therefore, they are losing a lot of energy and a lot of water through the dysfunctional skin barrier and other things that are also affected, as I've mentioned, is their ability to eat, to feed.

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We will go over all these details and how to best support these kids, the neonatal team, and the families in the next slides. How to make the diagnosis of EDD We are skin experts, so our ability to see a clinical diagnosis, to make a clinical diagnosis from a change in the skin is really important to be able to help these kids and their families.

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The evaluation is predominantly clinical in these cases. The first thing to do, as any good doctor, is to obtain a comprehensive history and family history, to construct a pedigree and determine the potential inheritance pattern, including the possibility of consanguinity. When we look at the patient, our ability to make a clinical diagnosis because of the various clinical features is important to help guide the acute next steps and to help the genetics team and the NICU team in looking for the right genetic diagnosis and performing the right genetic testing as early as possible.

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Identifying the genotype, as we understand these days, is crucial because a lot of our treatments depend on the specific genetic variants that we are looking at. Engaging the genetic team, as well as neonatology and all the other consultants from the get go is important. Please remember, although as dermatologists, histopathology is part of our daily life, in these situations, routine histology is not typically diagnostic for most of the EDDs

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Therefore, a skin biopsy is not the first go to diagnostic tool. It is our clinical features that help us with that.

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Well, you are the dermatologist on call, or you are in an area where there is no other people to call and you really are not sure what to do next, or you really know a little already, but you want to learn more. Therefore, we really build those guidelines to be able to support all of you, as well as the pediatricians as well as all the NICU team.

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How to prepare the environment. We need to think about this from really a perspective of the path of physiology. The skin is dysfunctional. That means this newborn is not able to really regulate their temperature or regulate the fluid loss, move their skin properly, or keep the moisturization. Therefore, the environment should be or should have a high humidity.

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We should measure constantly the temperature of the child and maintain a constant environmental temperature within the isolate that is humidified. Encouraging parental contact if the neonate is stable and of sufficient gestational age is highly recommended. This is a common question that we get is whether it is allowed for the newborn, who has a collodion membrane, or a newborn with a suspected EDD to leave the incubator.

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Well, that is a possibility. And typically it's based on time and the ability of the child to regulate their temperature, typically in the beginning in the presence of the nurse, over time, while the skin is shedding and the collodion membrane is shedding and the new skin is forming, their ability to sustain a normal temperature and to regulate their temperature and their fluid loss will start to get better.

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And their ability to stay outside of the isolate will become longer and longer over time. However, parental contact is important to not only support the regulation of the skin for these kids, but also to help with the bonding and not only the bonding for the child, but also for the parents. Implement protocols for initiating and weaning humidity.

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These are usually taken care of by

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neonatalogists who follow standard unit protocols for weaning to a crib. Typically it's a 40%, but we cannot generalize when to take the child out of the crib. A common question that we are asked a lot is what is the maximum humidity that we should put the incubator on, and how to wean it over time?

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There is not one answer for this, but typically we start at 80%. Some people also start at 60%. However, there is no one single, really study or data that really can explain what is the exact percentage of humidity that we should be using. Therefore, based on this personal experience with infants with EDDs, I would recommend between 60 and 80% as a start and then go over time weaning very slowly based on the response of the child.

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Please avoid the dressing and clothing or swaddling while in the isolate. Remember that the newborn with EDD has an inability, in general, to properly regulate their temperature. Therefore, they are at a higher risk for overheating, but also at a higher risk for hypothermia. So we should

be very cautious with how we are dressing those kids. Also, if we dress up the patients, the humidity factor will not really be an action the way we want.

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And other questions that come up a lot is whether phototherapy for neonatal hyperbilirubinemia is, you know, allowed in these setups. Yes, it is safe to perform phototherapy for neonatal hyperbilirubinemia when needed, even if the child is covered with emollients. Bathing and moisturization.

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When I'm speaking with dermatologists, we are all very well aware of the best and the safest ways to really bathe and provide moisturization for children. It is very important, as you know, to delay the first bath for more than 24 hours, like with any other child, to retain the vernix caseosa, which has a lot of good elements to support the skin of kids.

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After that, we can bathe maybe at least every 2 to 3 days thereafter. Why is it important to really bathe the child? Because we want, first of all, to help with the moisturization afterwards, but also to remove any bacteria and colonization over time. Please use non irritating fragrance free soap, free cleansers. As you know, we are already very familiar with this.

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Another crucial point that you might be asked about regularly is whether it is okay to mechanically remove the collodion membrane, or really scratch or rub the skin. This is not something we recommend. An important point here, and I think is very crucial for us at any level, not only in this case, is to respect the cultural practices of the family and the caregivers in general, particularly for bathing or moisturization,

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however, we have to ensure that these are safe for the child. Educating parents on proper techniques for bathing and maintaining a warm environment. Spending the time with them to go over these details is important. Using thicker, more occlusive moisturizers is highly recommended versus regular creams. Petrolatum and glycerin are safe in this age group and actually recommended. Please reapply the moisturizer in a visible layer several times a day.

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There is not really an exact timeline. For example, every 2 or 3 hours. But typically we try to coordinate the moisturizing at the same time as the feeding, which is around 3 to 4 hours. But we want to make sure that we are educating the nurses and the NICU, and the team of the NICU, that application should really be ample,

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and then it should be a visible layer of moisturization to be able really to support this inability of the child to keep the moisturization in because of the dysfunctional skin barrier. Please monitor for potential contact dermatitis and avoid or use with caution any of the following: topical salicylic acid, alpha hydroxyacids, vitamin D3 analoguess, corticosteroids, and other anti-inflammatory agents.

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Even sometimes topical antibiotics. Because of the risk of systemic absorption and toxicity. So we have to be very cautious with our recommendations at the level of topical medications.

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As you can see in this image, these kids have erythroderma, and whenever you have erythroderma as you may know, we will have a lot of dissipation of the heat. The temperature regulation is not really functioning properly as we want, as well as a lot of loss of the moisturization. So you can see here on the right side, this child who also has erythema but still intermingled with the collodion membrane that's starting to shed.

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Therefore you can see how shiny it is. Both areas because of the application of emollients frequently every maybe 3 to 4 hours in this case. And this is what we are aiming for.

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Now we move to the feeding and nutritional support. As you can see in this picture, this newborn has eclabium, which means the skin is very tight around the mouth, that they are not able to close the mouth properly. This affects their ability to feed properly. So it's very important for us to support the team and their ability to feed this child.

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Encouraging breastfeeding and breast milk conservation is something that is highly recommended, and that is something that the dermatologist can really support the primary team with, including a lactation consultant, a speech and swallow therapist as needed is also helpful. How can we, as dermatologists, help with that? One of the main ways we can support that is by recommending regular application of thick ointments in the oral area, and that will help shed the skin faster.

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The ability of the child to close the mouth is very important in this case. Another important thing that I highly recommend is if today the child is not able to breastfeed or bottle feed, please reassess on a regular basis, on a daily basis or every other day, because we really want to help

prepare the child to leave the NICU as healthy as possible, and we want the child and the family to be ready to take care of the skin and to be able to grow properly as soon as possible.

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We need to also recommend high caloric foods and a high protein intake, because a lot of these children are losing a lot of their energy trying to support their temperature regulation as well as their other skin functions. Therefore, recommending high caloric foods and supporting the team is very important, and I will leave the supplemental feeding choices to the primary team to make as well.

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What about pain and itch? This is a common question how to recognize pain. And well, this is actually through certain vital signs that the neonatologist and the NICU team are usually very familiar with. Seeing the child being in discomfort or really not acting themselves, being fussy. It's very important clue for the team that there's something going on, and pain and itch are symptoms that can be seen in children with EDDs

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Therefore, the early management and early engagement of the pediatric or perinatal supportive care team is highly recommended if available in your institution, and involving the family in the decision making regarding that is also very important because listening to the parents and their concerns, and a lot of times it is them, the parents actually, who notice that their child is not acting themselves or is in discomfort. When the child is a little bit older, particularly around full term, neonate.

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We recommend involving child life. As you can see in this picture, they can provide certain visual developmental tools to help the child grow at a neurodevelopmental level as well. Because despite the fact that they have EDDs They also are regular kids who need to grow, like any other child.

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As a dermatologist, the best way you can help with a pain and itch is to really encourage the application of emollients as regularly, as frequently as possible to help with the discomfort from the ichthyosis and the fissuring What about the eyes? Well, the eyes is not our field. However, it is very important to reach out to the ophthalmology team to support with the ectropion that we see in these cases.

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Again, what we can do as, dermatologists in these cases is recommend the application of emollients regularly in the periocular area.

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Auditory considerations. A lot of times you will see a build up of ear canal cerumen and debris, as well as hyperkeratosis and build up of skin in the external, auditory meatus. And this is why we highly recommend, consulting with the ENT team in these cases. They will take care of that, and they have the right tools to be able to really remove these debris.

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If, hearing screening, is has failed or even if it did not, it's highly recommended in these patients to really double check that sometimes the team is not aware of that. That's why I highly recommend that the dermatologist approaches, this neonatal period for patients who have EDDs as a holistic approach and not only focused on the things that we can do as dermatologist, but how we can support as skin specialists and experts and adds the holistic approach to the care of these newborns.

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Well, a lot of lines are needed in the NICU, whether this is for a baby with EDDs or with other conditions, the best team to deal with these lines would be the NICU team. In these cases, a lot of questions that come up to the dermatology team is whether we can use adhesive, tools or not. And, in these cases, really, we need to remember that the child has a lot of emollients on the skin, a lot of ointments, and adhesives often adhere poorly to the skin, and other times they can also induce injury.

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So in these cases we recommend avoiding or maybe using non or minimally adherent dressings on the skin, sometimes recommend really wrapping the lines or the tools around the arms, or the sides if possible to avoid the adhesives. However, if needed, securing the lines or two by affixing tape to the dressing material rather than to the skin is recommended.

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Monitoring. The NICU team does a great job of monitoring newborns at every level, and I usually leave that to their expertise. However, it is important for us to recognize those risks and highlight to them so that they are able to support the child in the best way possible. And in these cases, bringing to their attention the dysfunction of the skin barrier at the level of the temperature dysregulation, that these kids are at a higher risk of fluid loss and fluid imbalance, as well as poor weight gain, as well as electrolyte imbalance

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because of the dysfunctional skin barrier is very important. So therefore our role here is more to highlight these risks to the team rather than to be the people who are really monitoring on a regular basis because that's within their expertise. Okay? So from my perspective, our ability to support the team in that way is crucial. Now, if we're not sure what to do, please go back to the guidelines.

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That's why they are there. A lot of people met to really come up with these, a lot of experts in EDDs, multidisciplinary experts in EDDs to come up with these monitoring plans. So please refer to the guidelines whenever needed.

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Surveillance for infections is very important because of the disrupted epidermal barrier. We have an increased risk for bacterial and fungal skin infection as well as colonization. The most common, I would say microbes or the increased risk is mostly for Staph, Pseudomonas and Candida, and despite the importance of the frequent emollient use and humidification for these neonates with EDD, the practices of these frequent moisturization and the high humidity in the isolate increase the risk of this microbial burden.

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Therefore, we should be very cautious and we should have a low threshold of recognizing these infections. And it's very important for us to really share that point with the team, because our job, again, in these situations, as dermatologist, is that we are able to recognize what the skin function is, and we are also able to recognize whether this functional skin is not able to do and share that with a team.

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Culturing is very important. As clinically indicated, there is really no recommendation for routine prophylactic if you are culturing. So therefore we should really keep a close eye on any skin side or non skin side of infection. And the important thing otherwise is really to follow the protocol of the NICU for other cultures that are non skin related.

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For example the nerves and perianal areas.

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How to manage the infections. If it is a small area of involvement, topical antibiotics could be used. However, whenever it is really a larger area of involvement and whenever we have signs of potentially systemic manifestations, please consult infectious diseases as appropriate or discuss with the NICU team. And then use IV antibiotics. And that's typically, a choice or a

decision made through multidisciplinary discussion, particularly driven by the NICU team, who is really, an expert in dealing with newborn infections.

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This is the part that a lot of dermatology would be so happy to learn about, because we really love procedures and we love to support anything that is related to the skin. And one of the major procedural considerations, in these kids is really how to deal with procedures. And is it safe to, to perform procedures, performing procedures using local anesthesia is really an okay thing to do if needed.

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Okay. So, if needed, we can perform the procedures. Using local anesthesia is completely fine. An example of these procedures would include biopsies, debridement or escharotomies of constricting bands and circumcision. We do not have a wound healing problem, but we need to remember that the wound healing is often actually not delayed, but rather accelerated in individuals with EDDs

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Therefore, if you put a suture, for example, please remember to remove these sutures before the standard 7 to 10 days that we usually use for other conditions. So this is an important thing to remember in these cases. So the risk associated with this newborn, time and with patients who have EDDs is an accelerated type of healing rather than a delayed wound healing.

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Okay. As you can see in this image, one of the major risks that could be associated with having EDD in a newborn is the constriction bands that form in a baby with a collodion membrane with the evidence of hyper perfusion. A lot of times that you can see really hyper perfusion. Sometimes you can see, cyanosis. So we should be really following these kids on a daily basis,

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very close follow up while they are admitted in the NICU, it is our duty as dermatologists to support these patients and follow them up very closely. In this case, you can see that we performed what you can see here is a manual release procedure using the 11 blade, a scalpel from the polymer side to release this constriction band with a great improvement of the movement of the fingers over time.

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You can refer to the article below for further details.

29:45
Additional considerations that we as dermatologists should be aware of, particularly in neonates with keratinopathies or epidermolytic EDDs And in these cases, we need to remember that these patients can get blisters as part of their condition, and therefore we should be very careful to lance the large or tense blisters using a sterile needle or small blade at the blister edge to allow the drainage.

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If possible, we need to leave the blister roof intact and apply a gauze with gentle pressure using a light non adherent dressing, taking into consideration the blister location and severity is important. In the diaper area, we usually recommend soft silicone based dressings applying protective ointments, petrolatum based ointments, to the dressing before skin application is also very helpful. And then in general, for exudative blisters, place an absorbent layer over the non-adherence dressing and

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and outer layer without adhesives.

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Preparing fresh bandages and ointments in advance is very important for two reasons. Number one, to reduce the exposure of open skin, but also the other important thing to have everything prepared ahead of time is to shorten the time for addressing changes, to minimize the pain of the child, preparing the supplies before unwrapping and enlisting help if needed is important.

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Please never forcefully remove adherent dressings Instead, the trick here is to soak the area, apply a thick layer of emollient and use detachment spray to ease the removal. Pain can be improved by keeping lesions covered, optimizing pain management during dressing changes as optimal and in general. What I usually do is I reach out to the pain team or to the supportive care team, the perinatal supportive care team, and we plan things accordingly before we start any procedure.

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So please remember those risks that are associated with any procedures we do in the specific population. We have to be mindful of the age and of all the other dysfunctional skin barrier aspects while taking care of these patients.

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Additional considerations that we can also see in ABCA12-nEDD or non syndromic EDD. also known as Harlequin ichthyosis. This is one of the most severe forms of EDDs and with in the past, a very high morbidity and mortality rate. I would say that recently, with the help of a lot of

experts and a lot of support to these children, many of them grow up to become adults that are great, amazing people out there in the society supporting others, but also going to become great individuals.

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So it's very important for us to be able to reach out for help as needed, particularly for these more severe forms, and to be able to support these children and refer them to more advanced NICU and reach out to the right experts. First has a lot of resources in these cases, so also please you can go to the website.

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And I will talk about this later again. But you can go to the website and look for more resources for these specific patients. So in addition to all of the above, in this case we can usually use topical retinoids such as tazarotene alone or in combination with systemic retinoids to treat localized areas. For example, the severe constricting scale of the acral regions, the severe ectropion, the severe eclabium, tazarotene will help really shed that skin faster and then help really with the movement of these areas.

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Okay. And then this is very important not only, to shed the skin, but also to help with improving the rate of morbidity and mortality in general. Systemic retinoids are highly useful in these situations. And then if the child is experiencing respiratory compromise or severe constriction, particularly in the acral region, and it's also affecting their ability to feed and grow.

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Systemic retinoids can include acitretin for example. I'm not going to talk here about dosages, but in general, this should be really followed very closely by physicians who have extensive expertise in EDDs, and therefore these kids, if possible, should be referred to more advanced NICUs. Constricting bands may cause digital ischemia, as discussed before. And you can see in this patient performed by hand surgery,

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the surgeries that can really help release this constriction,

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and this child was able to recover greatly after that. Surgical procedures, as mentioned, are safe to perform. Again, keep in mind that the wound healing can be accelerated. And in general in these situations and the use of local anesthesia is completely fine if needed.

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Finally, we were able to provide the child with all the support. Most of these children grow up to do great after this long stay in the NICU Their skin, the collodion membrane, sheds and new skin is growing and we've been able to support them, to grow and to overcome all these risks. As dermatologists, together with a multidisciplinary team and with the support of the family and the shared decision making with the family members, it is truly a long journey to go from day 1 to 2 weeks or two months later after staying in the NICU.

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However, most of these kids do great and this is an important point to remember. It is very, important for us to recognize that a lot of these kids, their skin gets better and then their ability to take care of themselves and their families to take care of them is also something that we are here for, to support you as well as support them.

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So, ensuring that the parents and the caregivers receive this comprehensive social, psychosocial and complex care management support is crucial, and giving them hope and sharing with them resources, connecting them with families and other patients who are now potentially older children or adults is possible through, really the dermatology team, but also through first, who can provide a lot of resources and connect all these patients and families together.

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Because ultimately what we want is to be able to support these children. Engaging the supportive care teams and the primary care provider early on to facilitate this holistic, longitudinal, long term care is also very important, as I mentioned already, and involving the family and the care decisions on a daily basis during our rounds, during the multidisciplinary discussions, and taking into consideration their cultural values and preferences into our care planning is also important.

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Encouraging early parent infant bonding and really helping the family be part of the daily care is very helpful. What I usually do is that I ask the family to be present for the regular care that we provide in the NICU. And we also ask not only for the bonding or skin to skin contact, but we also ask them to feed the child.

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We also ask them to apply the moisturizing emollients. We also ask them to be there, to sing for them, to talk to them, to read a book. All these things are important because this child is spending their first days, weeks or months of their life in an environment that is really new to them. And the presence of the family is very important.

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The baby is ready to go home. So what are we supposed to do at this point? What are the risks associated with this discharge plan? Honestly, the risk is usually related to our ability to really recognize

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any morbidities that could happen during that time and also our ability to educate the families. Therefore, the most important point at this moment of discharge is to be able to educate the families properly regarding the care that they should be doing at home.

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And it all starts by really asking about the environment they're going to take the child to, and helping them preparing their home to welcome the child. Talking to them about bathing and moisturization, giving them examples, giving them samples, sharing with them resources, what to use, what not to use. And I usually what I do actually is I ask them to bathe the child in front of me one time and apply

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the moisturizing

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ointments in front of me so that we can fine tune you on the little details and avoid any subsequent complications. And this way they feel that they are involved, but they also feel that you are there to support them, and also that they are taking really, the hands on experience. Feeding, nutritional support, medication, management of any medications are needed.

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Surveillance for infection should be discussed at length with them, and we should share with them the really detailed symptoms and signs on how to recognize them. And most importantly, there should be a multidisciplinary follow up. And when we are talking about multidisciplinary follow up, we really need to engage care coordinators as needed, because these families will have to follow up with a lot of, really providers and team members later on, and we want to help them, support them so they don't feel overwhelmed.

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And it's very important to plan this together with the family based on their jobs, based on their language, based on their location, their region, wherever they live. And this is something I love about First, because First is able to provide these resources to these families online, but also in various ways. Right? So it's not only available as written information, but also as videos, but also as connection with other people who have the same condition or who care for people who have the same condition.

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Prior to discharge, assess the caregivers abilities to manage care effectively at home. Please take into consideration that people can have multiple barriers to doing that care. That could include, again, their language, but that could also include financial abilities. That could also include social concerns. So please feel free to reach out to First for any help you need in these situations.

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Please ensure that educational tools clear written materials. A lot of times I have illustrations there to help them. Tables, kind of, to write, to have an agenda of items. Okay, so you're going to wake up every day, this is what you're going to do at 8 a.m., this is what you're going to do at 10, at 11, etc..

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So kind of have like a nice schedule for them, this nice table and go over it. I try to go personally over it again. The nurse will go over it. So multiple people in different ways so that we make sure that these parents and these caregivers have all the tools that they need to support the child, but also to support themselves. Ensure that follow up appointments are scheduled.

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And this is very important. Prior to discharge, we have to make sure that the family has an appointment with pediatric dermatology with their pediatrician and other specialists based on the type of EDDs that they have.

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So we went really over the major points of the care of a newborn with EDD. It's very important to feel that you are supported. And that's why we went over all of this together. There are multiple ways where you can ask for help. One of them is going to First Foundation website and find a physician who has experience in ichthyosis or EDD, and therefore we are all there to help you.

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Please feel free to reach out to us by email or through First so that we can help you help these patients and their families. All the resources that you need are available. And thank you so much for joining us today and listening and watching this talk.

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