Reconstructive Management for Large Hematoma After Cooling for Neonatal Hypoxic Ischemic Encephalopathy

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Introduction

Neonatal **hypoxic ischemic encephalopathy (HIE)** is a brain injury that occurs due to insufficient oxygen delivery to the brain at birth. The recommended treatment is **whole-body cooling.**

Although cooling can prevent HIE's detrimental effects, it has a few known, albeit rare, side effects, including development of **subcutaneous fat necrosis (SCFN).**

We report an unusual presentation of SCFN that progressed to a **large hematoma** in a newborn undergoing whole-body cooling. He subsequently required **surgical intervention**, including hematoma evacuation, serial debridement, dermal substitute placement, and a split thickness skin graft.

Figure 1: Neonate undergoing whole-body cooling for HIE

Case Presentation

DOL 1 Term male infant (40w3d) delivered via emergency C-section for decreased fetal movement. He was apneic and pulseless at birth, requiring resuscitation with epinephrine and intubation. Apgar scores were 0, 0, 3, and 7 at 1, 5, 10, and 15 minutes. He was diagnosed with severe hypoxic-ischemic encephalopathy (HIE) and started on whole-body cooling. Workup revealed meconium aspiration syndrome, coagulopathy, seizures, and thrombocytopenia requiring pRBCs, platelets, and FFP.

DOL 2 Development of erythematous plaques on back and upper arms that evolved despite appropriate rewarming, progressing to coalescing indurated plaques and large bullae (Figure 2).

DOL 8 Appearance of large, violaceous hematoma (15 x 15 cm) on upper back (Figure 3).

DOL 10 Rapid expansion of hematoma (Figure 4) prompting surgical evacuation (approximately 300 cc of fluid) followed by serial debridement, I&D, and wound vac placement (Figure 5).

DOL 16 Application of dermal substitute followed by serial wound VAC changes.

DOL 34 Placement of split-thickness skin graft.

DOL 45 Discharged with excellent graft take and stable labs. At 4 months remained healthy with appropriate healing of surgical site (Figure 6).

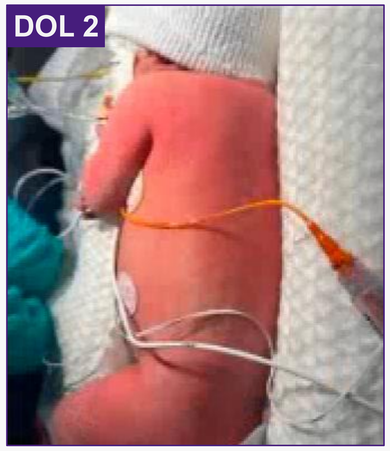

Figure 2: Redness and mild induration grossly, DOL 2

Discussion

Neonatal HIE is a severe condition, treatment for which includes **whole-body cooling**. **SCFN** is a well-documented but rare complication of this treatment. Most cases of SCFN resolve spontaneously, though **hypercalcemia** remains an important potential complication. Prior to this case, there have been **few reports** in which SCFN lesions spread and coalesce into a large underlying hematoma requiring surgical intervention due to overlying skin necrosis. This case represents a rare and early development of such a hematoma. The **early onset and rapid expansion in our patient** can likely be attributed to severe **thrombocytopenia**. Indeed, his poor coagulation profile and **bleeding risk** were major concerns when deciding on timeline of hematoma evacuation.

Our report emphasizes the importance of paying careful **attention to the skin of a neonate undergoing whole-body cooling** for HIE. **Early intervention** may be warranted if there appears to be a risk of necrosis. However, this risk needs to be weighed against **risks of procedural intervention** when the patient is coagulopathic.

Clinical Progression

Onset

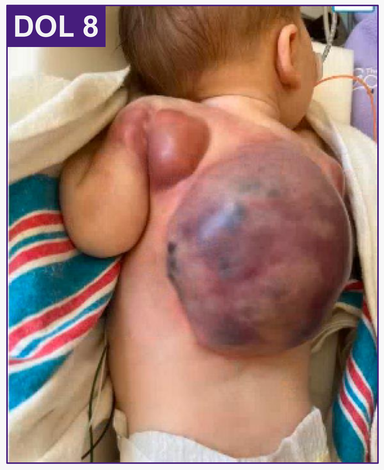

Figure 3: Large, tense hematoma with areas concerning for necrosis, DOL 8

Expansion

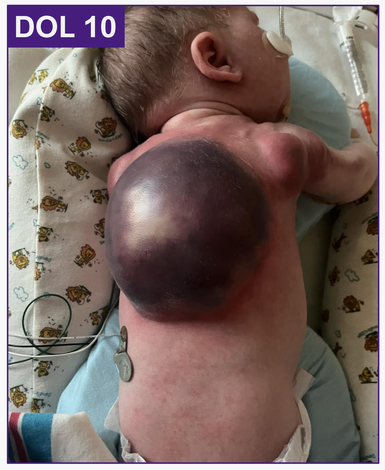

Figure 4: Expansion of hematoma prompting surgical evacuation, DOL 10

Evacuation + Debridement

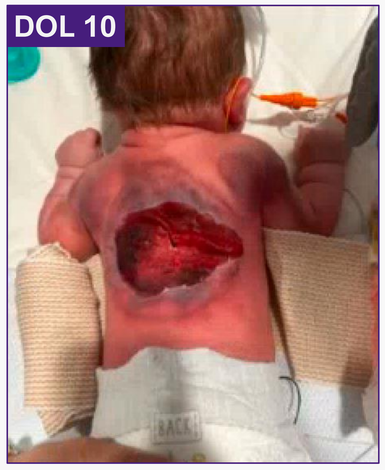

Figure 5: Post-surgical hematoma evacuation and debridement, DOL 10

Graft Outcome

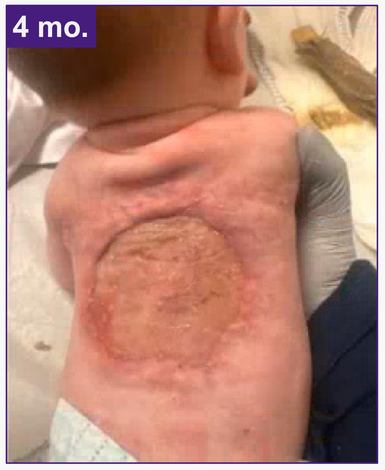

Figure 6: Well-healed split-thickness skin graft site 2.5 mo. after placement

References

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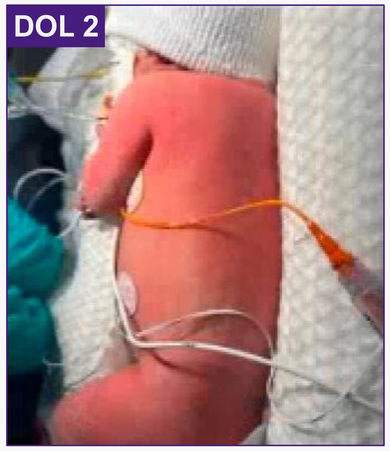

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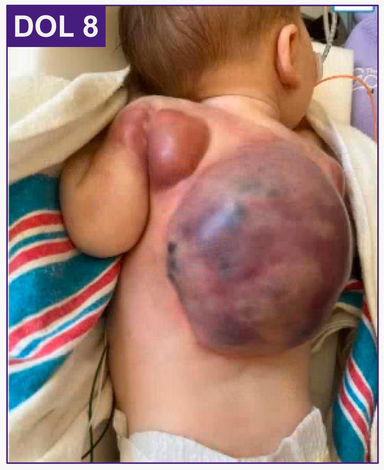

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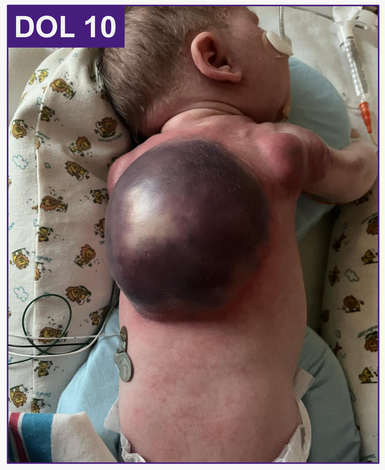

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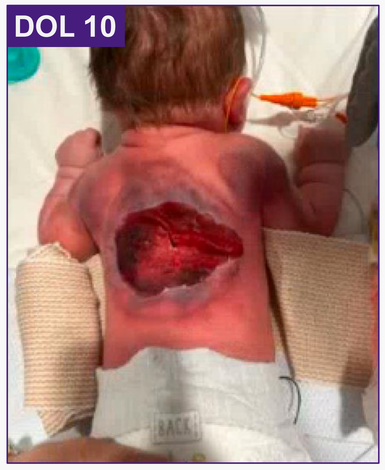

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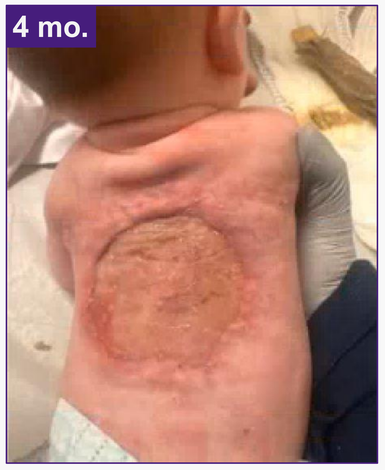

Figure 6: Well-healed split-thickness skin graft site 2.5 mo. after placement

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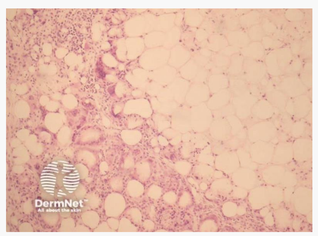
Introduction

HIE (hypoxic ischemic encephalopathy)

treated with

whole-body cooling

can result in



SCFN (subcutaneous fat necrosis)

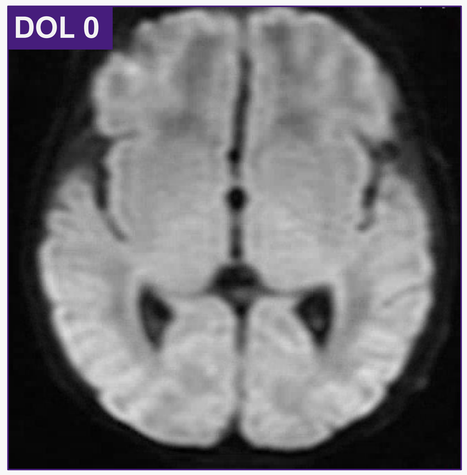
most cases → resolve spontaneously

rarely → progress to large hematoma → management?

our case report

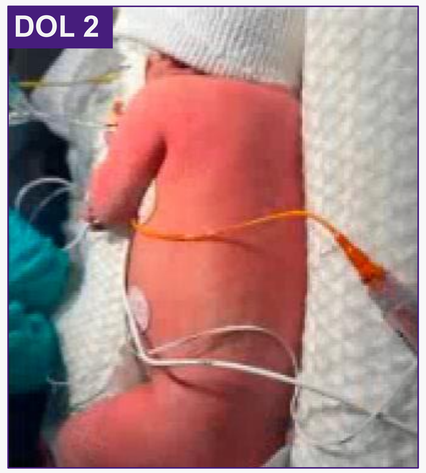
Case Presentation and Clinical Progression

Birth



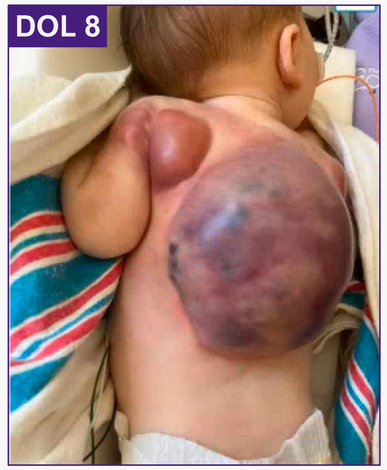
DOL 1: Brain MRI indicating severe HIE

Initial Lesions



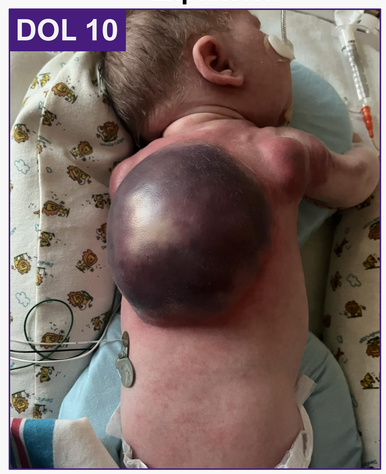
DOL 2: Development of redness and mild induration

Onset



DOL 8: Large, tense hematoma with areas concerning for necrosis

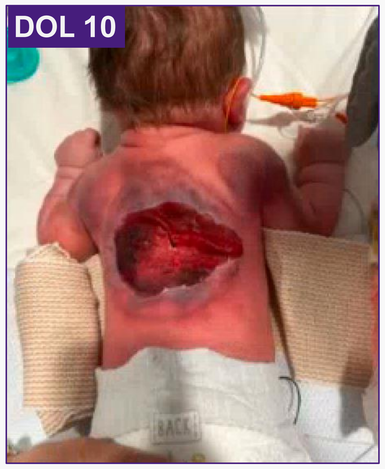
Expansion



DOL 10: Expansion of hematoma prompting surgical evacuation

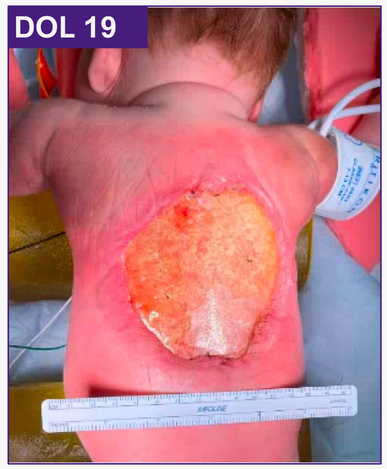
severe thrombocytopenia

Evacuation + Debridement



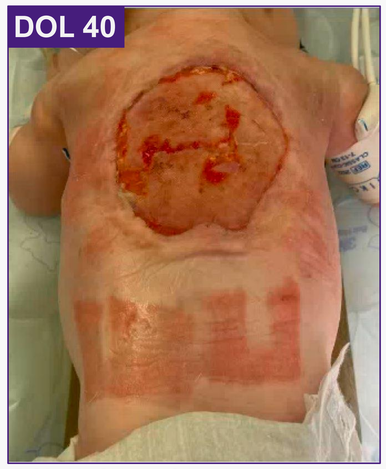
DOL 10: Post-surgical hematoma evacuation and debridement

Dermal Substitute



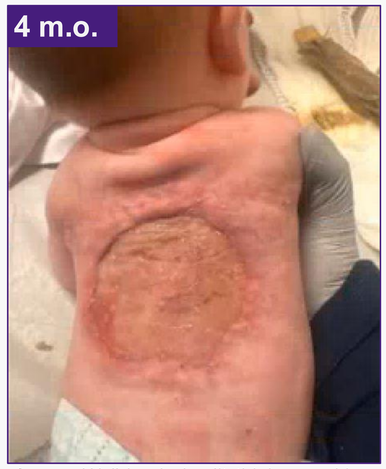
DOL 19: Dermal substitute after 3 days with excellent take

Skin Graft



DOL 40: Skin graft healing well 6 days after placement

Graft Outcome



4 m.o.: Well-healed split-thickness skin graft site 2.5 mo. after placement

Conclusion

SCFN is a rare complication of **whole-body cooling**. The rare **early onset and rapid expansion of our patient's hematoma** can likely be attributed to severe **thrombocytopenia**. Indeed, his **bleeding risk** was a major concern when deciding on the timeline of hematoma evacuation. Our report emphasizes the importance of paying careful **attention to the skin of a neonate undergoing whole-body cooling** for HIE. **Early intervention** may be warranted if there appears to be a risk of necrosis. However, this risk needs to be weighed against the **risks of procedural intervention** when the patient is coagulopathic.