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Management of epidermolysis bullosa simplex in pregnancy: A case report

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ABSTRACT

Epidermolysis bullosa (EB) encompasses a group of diseases characterized by extreme fragility of skin and mucous membranes, resulting in blister formation following minimal injury. There are 4 types of EB, with epidermolysis bullosa simplex (EBS) being the most common. We report our experience with the care of a parturient woman diagnosed with EBS. There is little literature on pregnancy in women with this condition. Special precautions are necessary during diagnostic and therapeutic interventions to avoid bullae formation or exacerbation of existing lesions. Frictional or shearing forces are typically more damaging than compressive forces. Multidisciplinary planning was done for our patient to ensure uneventful labor and delivery. Elective induction of labor was started at 40 weeks of gestation. She eventually underwent a cesarean delivery after failed trial of labor. We present this case to highlight the obstetric and anesthetic implications of caring for a parturient with EBS.

1. Introduction

Epidermolysis bullosa (EB) is a dermatological condition, inherited or rarely acquired [1], characterized by increased tendency to develop blisters (bullae) either spontaneously [2], or after mechanical trauma. Inherited EB is four types, defined by the levels in the skin at which blistering occurs (Table 1) [2–4]. It is not affected by race or ethnicity and affects both sexes equally. Clinical manifestations range from minor blisters associated with a normal quality of life to extensive lesions with scarring, contractures and reduced life expectancy [5]. In addition to skin, the musculoskeletal system, eyes, oral cavity, teeth, heart, kidney, pulmonary epithelium, gastrointestinal and genitourinary tracts may be involved [2,5,6]. There is no definitive cure. Little literature exists on the management of pregnancy in patients with epidermolysis bulls simplex. We describe our experience with the management of a parturient with this condition.

2. Case

A 27-year-old patient, G1P0 (body mass index 28), presented for prenatal care at 26 weeks of gestation. She was referred to the maternal-fetal medicine division of the obstetrics team because of her history of EBS since infancy. Bullous lesions would develop on her trunk, extremities and in the oral cavity with minimal friction; resolution was often complicated by scarring. Her medical history was also significant for iron-deficiency anemia (for which she received iron infusions). She denied any family history of EB and declined prenatal genetic testing, including amniocentesis. Physical examination was significant for a few scattered blisters over her trunk and upper extremities interspersed with areas of scarring. While her lumbar spine exam was reassuring, her airway exam was notable for scarring around the oral cavity, although without obvious lesions. An echocardiogram demonstrated mild mitral regurgitation, but no other abnormality. Records indicated an uneventful pregnancy so far.

Multidisciplinary planning involving an obstetrician, anesthesiologist, neonatologist, dermatologist and nursing personnel was done to formulate a plan for pregnancy and delivery. With the knowledge that frictional and shearing forces rather than direct pressure were more likely to cause bullae, we devised strategies to minimize any trauma during diagnostic and therapeutic interventions.

Weekly fetal surveillance was initiated at 34 weeks of gestation. An ultrasound done at 37 weeks demonstrated the “snowflake sign”, a sonographic marker for fetal skin denudation [7]. Elective induction of labor (IOL) began at 40 weeks gestation using buccal misoprostol. A specific protocol with a goal to avoid blister formation or a worsening of existing lesions was shared with all potential caregivers. Following successful epidural placement, neuraxial labor analgesia was initiated. IOL was continued with additional misoprostol followed by augmentation

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Table 1
Classification of inherited epidermolysis bullosa.

Type	Affected area of skin	Pattern of inheritance
EB Simplex[a]	Epidermis	AD, AR
Dystrophic EB	Dermo-epidermal interface within basement membrane	AD, AR
Junctional EB	Dermis	AR
Kindler syndrome	Multiple levels within basement membrane	AR

EB- Epidermolysis bullosa; AD-Autosomal dominant; AR- autosomal recessive.
[a] Our patient had EB simplex.

with oxytocin. After spontaneous rupture of membranes, an intrauterine pressure catheter was inserted. A decision for cesarean delivery (CD) was made due to failed IOL after 36 h and abnormal fetal heart rate. It was then noted that the epidural catheter had become dislodged. The epidural catheter was removed, and the surgery done uneventfully under spinal anesthesia. A female infant weighing 3220 g was delivered, with Apgar score of 9,9 at 1 and 5 min. Physical examination revealed extensive blisters on the fetus indicative of possible EB. Our patient's postpartum course remained uncomplicated and without blister development; she was discharged on the third postoperative day.

3. Discussion

EBS is the most common and benign type of EB and is caused by a deficiency of keratin structural proteins. Our patient suffered from the gen-sev variant of EBS, previously known as the Dowling-Meara type [4]. In this variant, blisters occur from birth and in herpetiform clusters (string-of-pearls appearance) on the trunk and distal extremities, often causing acral keratoderma. Some patients may improve when febrile, which is paradoxical, since a warm environment exacerbates the disease in all EB patients [6]. Rare associations with cardiomyopathy and muscular dystrophy have been reported.

Principles of care remain the same irrespective of type of EB. Pregnancy is relatively uncommon, due to the associated disability and concerns regarding affected children [8,9]. Nevertheless, successful pregnancy outcomes have been reported even in women with severe types of EB [3,9–13]. Women with EB are not at increased risk of pregnancy-related complications [8], and the skin itself does not seem to worsen during pregnancy [9]. Malnutrition, severe anemia and chronic infection may be associated and should be addressed [10]. Genetic counseling should be offered to patients, given the inheritance pattern [8,9,14], as evident from our case.

3.1. Intrapartum Considerations

Our patient desired a vaginal delivery; however, failed IOL, coupled with an abnormal fetal heart rate, necessitated performance of a CD. Normal vaginal delivery is considered safe and preferred to CD even if the mother is expected to deliver a baby with EB [8]. There is a theoretical risk of blistering of vaginal mucosa, possible sloughing of the cervical and perineal epithelium and damage to soft tissues of pelvic floor [9]. Prolonged labor and associated immobility may predispose to lesions in the lower back, buttocks and arms [10]. Episiotomy is acceptable to reduce perineal tears [8]. Besides obstetric indications, CD may be indicated with genital tract involvement to minimize perineal bullae [9]. Although, blistering and scarring can occur at the incision site, cesarean wounds tend to heal well in women with EB [8]. Intrapartum EB precautions were meticulously followed in our patient, without complications (Tables 2, 3). Rates of skin blistering in affected fetuses remain the same in both modes of delivery. Although there are no differences in outcome between vaginal and cesarean deliveries, risks and benefits should be discussed in all cases.

Table 2
Intrapartum considerations vaginal delivery.

- Caution with cardiotocography due to concern for blistering
- Limit internal examination to only when absolutely necessary
- Adequate lubrication of intrauterine pressure catheter[a]
- Avoid internal fetal monitoring
- Limit insertion of hands into the vagina when patient is pushing during second stage of labor
- Avoid operative delivery (vacuum extraction, forceps delivery)

[a] Water based lubricant (K–Y Jelly® used in our patient).

3.2. Anesthetic Considerations

Preservation of skin and mucous membrane integrity presents a challenge to the anesthesiologist (Table 4) [3,10,11,15]. Bullae formation may lead to additional pain, heat and fluid losses and risk of secondary infection [9,15]. Equipment including providers' hands should be well lubricated prior to patient contact. Oil-based (e.g. Vaseline®) and water-based lubricants (e.g. K-Y jelly®) are typically used. Use of adhesive materials is strictly contraindicated [8]. Non-adherent silicon-based materials are recommended and widely used [10,11,15,16].

Peripheral intravenous access and neuraxial block placement were accomplished without undue difficulty in our patient. Skin antisepsis was achieved with Chloraprep® applicators and securement completed using Mepitac® tape. Following dislodgement of the epidural catheter, spinal anesthesia was successfully administered for CD and general anesthesia (GA) was avoided in our patient.

In the absence of a contraindication, neuraxial anesthesia is recommended over GA for cesarean deliveries [3,8,10,11]. As many patients with EB are malnourished, determination of bony landmarks is often simple [17]. Skin is best disinfected with antiseptic solutions using applicators or aerosols [10]. The solution should be allowed to dry spontaneously; rubbing or wiping should be avoided – a gentle blotting action is preferred. Sterile lubricant gel may be used on the hands to aid palpation [3]. Since local anesthetic infiltration of the skin can cause bullae, a minimum volume should be used. Infiltration of ligaments and muscles is safe [18]. Epidural catheters can be secured using silicone-based tape or gauze. Alternatively, tunneling of catheters has been suggested [3].

GA is often challenging in these patients due to physiological changes of pregnancy coupled with airway changes unique to EB [3,9]. Recurrent oral blistering may lead to obliteration of vestibule, ankyloglossia, microstomia and abnormalities in dentition. Limited neck extension secondary to scarring may occur. Esophageal strictures may increase risk of regurgitation and aspiration [10]. Laryngotracheal stenosis has been reported. Nasal intubation may be better tolerated due to the respiratory epithelium being more resistant to shearing compared with oral mucosa [15]. Risk of corneal abrasions exists; eyes should be covered with gel pad or moist gauze after application of methylcellulose-based ointment. Gentle manipulation is key to

Table 3
Intrapartum considerations cesarean delivery.

- Gel or soft foam padding for pressure areas such as trunk[a] and extremities
- Minimize handling and transfer of patients, no rolling or sliding devices, encourage auto-positioning
- Adequate padding beneath intermittent pneumatic compression devices
- Cut adhesive border of electrocautery pad leaving only gel surface and secure with silicone-based tape[b]
- Consider bipolar diathermy instead of monopolar diathermy to avoid electrocautery pad
- Non-adherent surgical field drapes
- Consider bigger skin and tissue incision to aid in atraumatic delivery of neonate
- Subcuticular sutures can be used for closure of skin
- Avoid vigorous rubbing to stimulate infant at time of delivery

[a] Sheepskin pad used in our patient.
[b] Mepitac® used in our patient.

Table 4
Considerations and options for monitoring.

Equipment	Recommendations
• Venous cannulation	• Sites limited by blistering and contractures • Avoid undue shearing forces when occluding extremity with tourniquet or hand • Antisepsis by dabbing rather than rubbing • Secure with gauze or silicone-based tape,[a] suturing
• Non-invasive blood pressure cuff	• Soft padding under blood pressure cuff[b]
• Pulse oximeter	• Use clip on probes • Wrap finger in cling film before placing pulse oximeter • Stick tegaderm® to sticky side of wrap around pulse oximeter probe and then wrap around digit
• Electrocardiogram Leads	• Trim adhesive part and secure with silicone tape • Needle electrodes • Small squares of defibrillator pad between skin and EKG electrodes • Hydrogel backed electrodes, silicone surface between skin and electrodes
• Foley catheter	• Secure using silicone-based tape or gauze
• Arterial cannulation	• Secure using silicone-based tape, suturing

[a] Mepitac tape®used in our patient.
[b] Webril ®cotton padding used in our patient.

prevention of bullous lesions. Difficult-airway equipment should be available at all times [4,10,11,15,17–19].

All anesthetic drugs are acceptable; succinylcholine and inhaled anesthetics are avoided if there is associated muscular dystrophy. Hypoalbuminemia can cause altered volume of distribution for medications, necessitating modification of drug doses [10,16].

3.3. Postpartum Considerations

Multimodal analgesia is crucial, to prevent excessive movements and new skin trauma [19]. Pruritus is often bothersome in EB, worsened by use of narcotics for analgesia. Ant-pruritic medications should be administered if necessary. While breast feeding is not contraindicated, blisters may cause difficulty in doing so. Lubricated nipple shields may help reduce bullae formation [9]. Social support and use of a lactation consultant is needed when patients' hands are affected by blisters, scarring or pseudosyndactyly [9]. There does not appear to be any increased risk of thrombotic events [10]. Injections can be administered if necessary; areas with skin lesions are avoided [3].

Our patient's pregnancy and postpartum course remained uneventful. Parturients with EB often need considerable support due to their disability. A coordinated team approach can facilitate uneventful outcomes [20].

Contributors

Nidhi Shah helped conceive and prepare the manuscript.
Sangeeta Kumaraswami helped conceive and prepare the manuscript.
Juliet E. Mushi helped conceive and prepare the manuscript.
All authors approved the final manuscript.

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Declaration of Competing Interest

The authors declare that they have no conflict of interest regarding the publication of this case report.

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