EPIDERMOLYSIS BULLOSA: A RARE DISEASE OF
ANAESTHETIC INTEREST

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The purpose of this paper is to discuss the difficulties encountered in anaesthesia in epidermolysis bullosa. Various techniques have been used in the case described. All these have had their disadvantages. However, they do indicate that such cases may be anaesthetized with success. No claim is made that any one method is ideal.

In view of the rarity of this condition, it may be of interest to review briefly some aspects of its clinical features, aetiology, pathology and treatment.

CLINICAL FEATURES
Epidermolysis bullosa is a rare, chronic, hereditary disorder which affects structures of epidermal origin. It exists in two main types, simplex and dystrophic, but several subtypes are also known to occur. The prominent feature of this disease is the appearance of bullae which often arise as a result of slight trauma (Cockayne, 1933). Bullae may, however, arise spontaneously and in all cases are initially sterile. They contain clear or blood-stained fluid according to the degree of trauma and may become infected.

Epidermolysis bullosa simplex.
In this type of the disease the bullae are usually confined to the hands and feet, because these parts are more frequently subjected to trauma. They may be present at birth or appear within the first few years of life. Healing of the affected areas takes place without cicatrisation. The mucous membranes are not affected and the teeth, hair and nails are normal. The general health is usually good and the tendency to bullae formation regress towards puberty.

Cockayne (1938) describes a more localized form of epidermolysis bullosa in which formation of large bullae is restricted to the inner and outer aspects of the soles of the feet. They usually only arise in association with warm weather, give a sensation of heat and discomfort and are first noticed between the ages of one and two years.

In World War II, Waisman (1944) described another localized form. This affected the hands and feet after heavy manual activity or long marches and necessitated discharge from the fighting forces.

Epidermolysis bullosa dystrophica.
The manifestations of this type are more severe. Besides occurring in the skin, bullae are found arising in the mucous membranes, and abnormalities of the teeth and nails may be present. Several subtypes are recognized depending on the severity and mode of transmission.

Recessive forms. There are several types, all of which manifest a recessive inheritance (Newcomer, Zeilegna and Stemberg, 1956) and usually cause death before puberty. Those who suffer from these forms of epidermolysis bullosa are usually underdeveloped and mentally subnormal, but some of them reach adult life and have children. The bullae are larger than in the simplex type and are deeply situated. They are usually present at birth (fig. 1) but their appearance may be delayed until the child is one or two years old. Bullae formation may occur in the oral cavity, oesophagus, upper respiratory tract, genitourinary tract and conjunctiva. The teeth are absent or deficient in number, in which case they are subject to decay because of defective enamel. The nails are invariably absent or deformed and growth of hair may be disturbed. Formation of scars and epidermal cysts is common.

Herlitz (1934) described the most severe form of this group under the term epidermolysis bullosa hereditana letalis. This occurs at birth or
shortly afterwards. The bullae involving the skin and mucous membranes become so extensive that death occurs at the age of three months. Often, blood and tendons may be clearly seen under the denuded areas, especially at the extremities. It is rather strange that trauma such as nipping or rubbing does not give rise to bullae formation. A positive Nikolsky's sign is present, however, which is demonstrated by the easy removal of the upper epidermal layers on slight pressure. Dystrophy and deformity of the nails may be evident. Some of them may be absent at birth or fall off soon afterwards. If the lesions are progressive they may give rise to skeletal atrophy of the terminal phalanges.

Dominant form. This is classified as a separate type whose severity is intermediate between the dominant simplex and recessive dystrophic forms. The teeth and hair are normal and the majority of patients are well developed. The nails may be absent but are usually greatly thickened and clawlike. Bullae, due to trauma, occur at birth or soon afterwards and are particularly prominent in the forehead and extremities. They heal with the formation of atrophic scars. Epidermal cysts and milia are common in the vicinity of the scars. The mucous membranes are involved but to a lesser extent.

AETIOLOGY
This is highly speculative but a common theory of Engman and Mook (1906) is based on the finding of a definite deficiency of elastic tissue in the papillary and subpapillary layers of the cutis in both the normal areas and those affected by the bullae. This deficiency is thought to account for the susceptibility of the epidermis to bullae formation following trauma. In many cases, however, the quantity of elastic tissue is said to be normal.

Others (Winer and Orman, 1945) suggest that there is a primary inherited defect involving the permeability of the vessel walls. This permits transudation of serum into the upper layers of the epidermis with consequent production of bullae. The destruction of elastic tissue is attributed to the resulting oedema.

PATHOLOGY
In the simplex type, the bullae usually occur within the epidermis and heal without scar formation. The elastic tissue is frayed and splintered but not destroyed. In the dystrophic type the lesions occur in the subepidermal tissues with scar formation and considerable destruction of elastic tissue. Mild inflammatory changes may be evident in the cutis.

DIFFERENTIAL DIAGNOSIS
Diagnosis has to be made from conditions such as dermatophytosis, blisters, pemphigus neonatorum, congenital syphilis, bullous erythema multiforme, pemphigus vulgaris and porphyria congenita.

TREATMENT
No satisfactory treatment has been described. The treatment at the present time is with a.c.t.h. or cortisone, but the results have been disappointing. The rapidity with which bullae appear and the slight trauma required for their production provide many nursing problems.

In infants, bullae arise through scratching the body or rubbing the hands, heels or head on the bedclothes. The lesions on the arms and legs may be prevented to some extent by fastening the limbs to the side of the cot. Unfortunately bullae develop beneath the restraining bandages but are less severe if the bandages are applied over layers of vaseline gauze and cotton wool.

The feeding of an infant is often initiated by slight pressure of a teat on the dorsum of the tongue (fig. 2) This rapidly leads to bullae and scar formation at this site and makes the child reluctant to feed. Tube feeding, instituted to overcome this disability, leads to lesions in the nasopharynx and around the nares which soon become infected. Trauma due to repeated insertion of the oesophageal tube may be minimized by maintaining it in position. This requires the application of strapping to the face. When the strapping is removed, the underlying bullae or raw areas are evident.

These are only a few of the difficulties which have to be solved. Innumerable problems arise, however, and they tax the skill and ingenuity of the nursing staff to the utmost.

Similarly it is readily apparent that the anaesthetist, when confronted with such a case, will also have many difficulties to overcome as may be seen in the following case history.
CASE HISTORY
In a family of four, the patient, his brother and younger sister showed manifestations of epidermolysis bullosa. The elder sister had no skin disorder but had suffered from eczema in infancy. The parents appeared to be free from the disease, but asthma and eczema were evident in the family of the maternal grandmother.

The patient first developed blistering of the legs and hands shortly after birth. Healing left bluish scars and blackened finger nails.

Three years later, there were two episodes when he coughed up blood after a bout of crying. These were followed by a slight haematemesis and another haemoptysis. The mother complained that "he was always crying, easily upset, touchy and nervous". He was worried about his rash and frequently remarked that he wished it would get better.

The blood picture, including clotting and bleeding times, was normal. No cause was found for the haemoptysis or haematemesis.

During the past three years, the patient attended hospital for dental treatment and the problem of anaesthesia was approached differently on each of three occasions.

He was first anaesthetized for teeth extraction by means of a naso-oral inhaler. As a result of this appliance, he developed severe blistering of the mouth, face and nose.

When he again attended for treatment, it was decided, in view of his past history, to attempt conservative dentistry and his teeth were filled without anaesthesia. He was unco-operative and developed multiple bullae on the limbs from the restraint applied by the attendants.

Recently he was found to require further fillings and the extraction of several teeth. In view of his past experience, it was obvious that he would not tolerate a similar procedure, even under local anaesthesia.

His mother was equally concerned about the prospect of him having a general anaesthetic as both her sons had developed bullae through "fighting when coming out of the anaesthetic".

In avoiding these complications, the only satisfactory way of maintaining anaesthesia for dental fillings and extractions was by endotracheal intubation. Although there is no record of bullae occurring actually within the larynx in this condition, the possibility appeared likely, as they have been described in the upper respiratory tract and the oesophagus. Because of this danger, it was decided to insert an endotracheal tube of narrow bore so that contact with the larynx would be avoided as much as possible. He had suffered from eczema in infancy. The parents appeared to be free from the disease, but asthma and eczema were evident in the family of the maternal grandmother.

The patient developed bullae on the inside of the lips and mouth due to the intra-oral surgical manipulation but did not develop stridor which suggested that there had been no laryngeal trauma.

DISCUSSION
Anaesthesia in epidermolysis bullosa necessitates the avoidance of trauma to the skin and mucous membranes. In severe cases bullae will arise on the slightest contact (figs. 3 and 4). It is obvious that the lesions cannot be completely avoided but their severity may be minimized.

The mother's description of the boy's nervousness suggests that premedication should be adequate. It is probably unwise to prescribe barbiturates such as quinalbarbitone because of the possibility of postoperative hallucinations, especially if pain is present. Rectal thiopentone may be useful in operations of longer duration. Chlorpromazine is probably the drug of choice, but this possibility was overlooked.

Intubation may present certain hazards. The laryngoscope must be inserted carefully as the teeth in this disease are carious. It is preferable to use a Macintosh laryngoscope rather than a Magill so that trauma to the posterior surface of the epiglottis, with the resulting dangers of oedema and supralaryngeal obstruction, is prevented.

To avoid bullae formation, induction must be pleasant, smooth and rapid and stridors avoided. This is best achieved by intravenous thiopentone provided it is performed in a painless manner and the child is co-operative. The use of a face mask
FIG. 1
Epidermolysis bullosa dystrophica showing bullae on legs of a two-day-old baby.

FIG. 2
Lesions on tongue and nares arising from teat and tube feeding in the same baby eight months later.

FIG. 3
Bullae on ankle of patient suffering from epidermolysis bullosa dystrophica.

FIG. 4
Bullae formation and scarring on lips, tongue and chin of patient due to eating.
FIG. 5
Bullae formation and scarring on lips, tongue and chin of patient’s brother.

FIG. 6
Atrophic scars on knees of patient’s brother.

FIG. 7
Atrophic scars on elbow of patient’s brother.

FIG. 8
Lesions on hands showing a deformed nail.
for induction is undesirable as bullae will form at the site of contact and under the chin due to the supporting fingers.

Oral intubation is less traumatic than if the endotracheal tube is introduced through the nose. Its smooth passage through the larynx is facilitated by means of a relaxant. If intubation is traumatic, bullae may arise within the larynx and spread down the trachea. Therefore it would appear to be dangerous to use an endotracheal tube whose circumference makes intimate contact with the larynx. Bullae arising with the tube in situ will probably rupture and become infected. If they arise after the tube has been withdrawn, an immediate tracheotomy may be necessary. The introduction of a tracheotomy tube, however, would cause a similar reaction and death might result from asphyxia.

The introduction of an oiled throat pack, if inserted carelessly, may cause bullae within the oral cavity. If it is placed posteriorly, it will occlude the nasopharynx so that the resistance arising from the use of a narrow bore endotracheal tube will give rise to a pronounced respiratory obstruction.

It is advisable to ensure that recovery is peaceful so that restraint is unnecessary. It appears, then, that the depth of anaesthesia should only be sufficient for the operation in question. Trichloroethylene has certain disadvantages in that it causes postoperative vomiting and is slowly excreted. When given in small quantities as in this case it gave satisfactory results.

Most of these cases are now treated on a.c.t.h. or cortisone but the dangers associated with this therapy have been fully described by Mushin (1957). The introduction of an endotracheal tube in the manner described above had no serious consequences. That it has been performed successfully in one case does not necessarily suggest it is a safe procedure.

A satisfactory form of anaesthesia in epidermolysis bullosa has not yet been described and at present one can only minimize the dangers incurred.

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REFERENCES


