

Bullae Formation from a Contoured Stethoscope

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Cutaneous bullae formation has long been recognized as a complication of acute barbiturate poisoning¹ and is a major anesthetic problem in patients with epidermolysis bullosa.² This report describes the uncommon occurrence of cutaneous bullous lesions localized under a contoured stethoscope attached to a blood pressure cuff in a patient who had an otherwise uncomplicated hospital course.

REPORT OF A CASE

A 65-year-old man was admitted to the hospital with a three-week history of left-sided focal seizures diagnosed as reading epilepsy. His past medical history included twenty years of hypertension and a history of smoking for thirty pack years. The patient was taking hydrochlorothiazide and was allergic to penicillin. Physical examination was unremarkable, as were laboratory values and chest roentgenogram. His electrocardiogram revealed evidence of an old, anterior wall myocardial infarction. Arteriography revealed an ulcerated plaque in the left internal carotid artery for which an endarterectomy was scheduled.

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Received from the Department of Anesthesiology, the University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27514. Accepted for publication December 16, 1980.

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Key words: Equipment: stethoscope. Complications: blisters; bullae.

The patient was premedicated with diazepam, 10 mg, orally. Prior to induction of anesthesia, an alcohol-washed Diasyst† (contoured stethoscope) attached to a blood pressure cuff was placed on the right forearm for auscultation of arterial blood pressure. Prior to induction of anesthesia, a right radial artery catheterization was performed and cuff occlusion pressure measurement confirmed the accuracy of the transduced arterial pressures. Anesthesia was induced with thiopental, 250 mg, iv, and endotracheal intubation was facilitated by intravenous administration of succinylcholine. Anesthesia was maintained with 60 per cent nitrous oxide and halothane at an inspired concentration varying between 0.5-1.5 per cent. Fentanyl, 100 µg, and pancuronium, 5 mg, were also given. Neuromuscular blockade was reversed with neostigmine and atropine. The intraoperative course was uneventful with arterial blood pressures ranging from 130/70 to 160/88 torr. The patient was alert to verbal commands, and the trachea was extubated before leaving the operating room.

Upon arrival in the recovery room, the radial artery catheter was removed. Subsequent blood pressure measurements were made by use of the blood pressure cuff. The one-hour stay in the recovery room was unremarkable until the blood pressure cuff and contoured stethoscope were removed. Tense bullae surrounded by erythema were then noted within the inner aspect of the contoured stethoscope (fig. 1). The bullae were treated with 0.1 per cent triamcinolone cream and Vaseline® gauze. The lesions resolved in four days.

† Dupaco, San Marcos, California.



FIG. 1. Bullae formation on the right forearm.

DISCUSSION

Bullae are a common cutaneous sign of severe illness such as barbiturate and carbon monoxide poisoning,³ immobilization,³ and diabetes mellitus.⁴ Because the bullae were localized over the inner aspect of the contoured stethoscope, I believe the bullae were caused by negative pressure applied during inflation and deflation of the blood pressure cuff. Cuff inflation causes compression of the forearm with a seal formed by the outer portion of the contoured stethoscope. Upon deflation, the pressure in the inner aspect of the stethoscope is subambient and the effect is similar to a suction cup. Suction applied to the skin may result in separation of the basal cells from the underlying basement membrane and dermis⁵ with fluid formation that is similar to interstitial fluid and peripheral lymph.⁶

Simultaneous with the production of negative pressure by the contoured stethoscope, the inflation of the blood pressure cuff can produce temporary localized ischemia. This period of ischemia may be prolonged if the cuff is not totally deflated. Pressure-induced ischemia has been implicated in the formation of bullae.³ Perianesthetic drug administration may have also predisposed our patient to blister formation since barbiturates and narcotics have been reported to cause bullae formation.^{1,7} All of these factors may have been additive to the effects of negative pressure on the skin, thus causing blister formation in the patient.

The attachment of a contoured stethoscope to a blood pressure cuff allows for auscultation of the blood pressure in addition to pulse palpation and manometer oscillation. Frequently, the skin under the contoured stethoscope is imprinted with the shape of the stethoscope and may be the initial step in bullae formation. When bullae are formed, appropriate care is obviously required if infection is to be prevented.

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