consciousness in the absence of structural brain damage. In the following report we describe a patient in whom extensive investigation failed to reveal structural damage either to the brain or the heart in the presence of electrocardiographic nontransmural infarction pattern.

**CASE REPORT**

A 74-year-old Mexican woman presented to the emergency room after a severe beating over the head, face, neck and chest, and subsequent loss of consciousness for three hours. On admission she complained of nausea, pain in the areas in which she was beaten. There was no history of neurologic or cardiologic abnormalities, hypertension, or diabetes mellitus. On initial examination, the patient was alert and oriented, and her vital signs were stable: blood pressure 98/60 mm Hg and pulse rate 64/min. There was a small laceration on her left lower eyelid, with severe ecchymosis and swelling over much of her face. A subconjunctival hemorrhage was present in her left eye, but fundoscopic examination was completely within normal limits. Her buccal mucosa, both lips, and oropharynx were also swollen and ecchymotic. Her neck was tender but supple, and there was tenderness over the upper third of her sternum in an area of ecchymosis. The remainder of her general physical examination was completely within normal limits, and a neurologic examination did not show any localizing signs or changes on serial examinations. X-ray films of her skull were negative except for fractures of the condyle of the left mandible, the base of the left maxilla, and the left zygoma. X-ray films of her cervical, thoracic, and lumbosacral spine were normal. No fractures were evident on chest-x-ray film, and the heart size was within normal limits.

Her hospital course was benign except for a slight elevation of temperature to 38.5°C in the first 48 hours, which resolved spontaneously. No headache, stiff neck, or focal neurological signs developed. There were no abnormalities of serum electrolytes. An EEG showed well-developed 9-9 1/2/sec background activity, without focal abnormalities. Computerized axial tomographic studies of the head were performed and revealed no evidence of subdural hematoma, mass lesions, or cerebral infarct. A slight asymmetry of the lateral ventricles was seen and considered secondary to patient positioning. Mild cerebral atrophy was present. A lumbar puncture was refused by the patient.

A routine electrocardiogram performed on the second hospital day was markedly abnormal (Fig 1, left). This showed marked deep symmetrical T wave inversion in the anterior leads, with subsequent evolving resolution of these changes over several days. There were no serial enzyme changes compatible with myocardial infarction including studies of creatinine phosphokinase (CPK) and lactic dehydrogenase (LDH) isoenzymes, or serum glutamic oxaloacetic transaminase (SGOT) over a five-day period. A technetium pyrophosphate cardiac scan on the fourth day after admission showed no evidence of recent myocardial infarction or confusion. An echocardiogram showed evidence of left atrial enlargement by ratio only. Eight weeks after her initial hospitalization, the patient was seen in followup and was completely asymptomatic. A vectorcardiogram at that time showed no evidence of infarction. A repeated electrocardiogram showed only mild diffuse T wave abnormalities (Fig 1, right).

**COMMENT**

In several studies of head trauma with electrocardiographic observations, detailed evaluation of central nervous system and cardiac pathology were not made in the documented cases in which electrocardiographic changes were observed.1,3,5 We feel that this case is of interest since it is the first reported in which such remarkable electrocardiographic changes simulating acute subepicardial myocardial infarction occurred in the presence of cerebral concussion alone, with absence of acute structural brain pathology documented by careful serial clinical and laboratory examinations, including computerized axial tomography. Myocardial infarction or confusion was ruled out by normal serial enzyme studies and a normal cardiac scan, the best of noninvasive efforts. We conclude that when confronted with patients with head trauma, deep T wave inversions even demonstrating serial evolution do not necessarily signify central nervous system or myocardial structural damage.

**REFERENCES**


**Bedside Construction of a Custom Cuirass for Respiratory Failure in Kyphoscoliosis**

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We describe the application of a fiberglass orthopedic casting material for the construction of a custom cuirass for a negative-pressure body ventilator and the use of this cuirass in the weaning of a patient with kyphoscoliosis from therapy with conventional mechanical ventilation and in her long-term care. This fiberglass material permits the rapid construction of a durable shell that conforms to the patient's unique anatomic deformity.

The effective utilization of a cuirass with a negative-pressure ventilator in the care of patients with scoliosis has been recently reported.1,2 The thoracic anatomic structure of these patients often requires the construction of a shell customized to a complex set of body measurements or to a template made of plaster of Paris which is

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forwarded to a distant manufacturer. The use of a commercially available fiberglass orthopedic casting material (Lightcast II) in the rapid construction of a customized cuirass and its use in the immediate and long-term care of a patient with severe kyphoscoliosis is described.

Case Report

This 25-year-old woman with severe kyphoscoliosis was admitted to the intensive care unit following respiratory arrest. Arterial blood gas levels prior to the arrest included pH of 7.18, arterial carbon dioxide tension (PaCO₂) of 87 mm Hg, and arterial oxygen pressure of 30 mm Hg. Endotracheal intubation and mechanical ventilation were required. Multiple attempts to wean the patient from mechanical ventilation failed because of recurrent accumulation of carbon dioxide; however, the patient was extubated and placed immediately in a respirator (Emerson chest respirator) utilizing a plastic "poncho" wrap. Arterial blood gas levels were maintained within normal limits during ventilation via the cuirass, but retention of carbon dioxide recurred initially when the cuirass was removed. Progressively lengthening periods without ventilation via the cuirass were eventually possible, until the patient used the ventilator only at night.

A custom shell constructed from photographs and measurements forwarded to a manufacturer did not conform properly to the patient's thorax. A second shell was constructed in the following manner. The patient was fitted with two T-shirts (Stockinet) extending to below the iliac crests. Pads to a thickness of approximately 10 cm were placed between the two T-shirts anteriorly, in order to create the necessary air space between the patient and the shell. A thin layer of fiberglass (Lightcast II) was wrapped around the thorax and abdomen from the axillae to the iliac crests and was contoured over the abdomen to just above the pubic area. The fiberglass was polymerized using an ultraviolet light.

The body cast was then cut along the posterior axillary line using a standard electric cast-cutter. The anterior portion of the cast, as the cuirass, was removed and was reinforced with additional layers of fiberglass. The posterior half was discarded. Final molding of the shell was done with the cast-cutter to avoid bony prominences and to remove areas that caused the patient discomfort. A hole was cut in the middle portion of the shell to allow insertion of tubing from the Emerson cuirass power source of the respirator (Emerson cuirass). The edges of the shell were smoothed using paste resin (Lightcast) and were covered with moleskin. The inner periphery of the shell was padded with foam plastic, glued to the fiberglass. The entire shell, including all padding, was then covered by adhesive plastic drape (Steri-Drape) as an airtight covering.

The final shell proved to be comfortable and effective in maintaining a normal PaCO₂ during sleep. In addition, the patient could remove the shell and replace it at night, thus providing greater independence. She continued nightly use of the cuirass and has remained well over a six-month follow-up period.

Discussion

Since their first reported use in 1832, negative-pressure body ventilators have undergone numerous modifications of design and clinical applications. In some form, these ventilators have been employed in the care of patients with chronic obstructive pulmonary disease, viral or bacterial pneumonia, in the neonate, after thoracic surgery, and in the care of patients with diseases affecting the neuromuscular competence of the respiratory muscles. Modifications to produce a continuous subambient pressure and to attempt patient-initiated assisted ventilation have also been reported, as has the simultaneous use of a cuirass with endotracheal intubation and assisted positive-pressure mechanical ventilation.

A reduction in PaCO₂ and end-tidal carbon dioxide tension was consistently observed after application of the original plastic poncho device in this patient. In addition, synchronization of the patient's ventilatory efforts while asleep was observed on tracings of the end-tidal concentration of carbon dioxide (Fig 1) from a mass spectrometer (Chemetron RICS II) used for continuous monitoring. This finding is similar to that demonstrating a reduction in diaphragmatic electrical activity and presumed decreased mechanical work of breathing during ventilation via a cuirass in a similar case reported elsewhere.

Although efficacious, the plastic poncho device required approximately one hour each night to obtain an adequate seal and did not permit nursing care without the discontinuation of ventilation. Furthermore, the patient complained of accumulation of heat inside the wrap and of pain in the thoracic spine, which was associated with the necessary prolonged supine position.

The use of the orthopedic fiberglass casting compound (Lightcast II) in this context has, to our knowledge, not been previously reported. The fiberglass provided a durable shell that was prepared within a few hours and could be molded directly to the contour of the patient's unique thoracoabdominal anatomic structure. Furthermore, the patient was available to guide subsequent minor modification completed at the bedside. Therefore, it is suggested that the negative-pressure ventilator with cuirass, which has already successfully been utilized in the long-term care of many patients with neurologic or muscular dysfunction, may also be of value in selected patients with a chronic respiratory failure due to kypho-
scoliosis. The utilization of this bedside method for the construction of a custom shell may extend the application of this ventilatory technique to those patients.

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Adult Respiratory Distress Syndrome Caused by Mycoplasma pneumoniae*

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Two patients with the adult respiratory distress syndrome were found to have rising complement-fixation titers to Mycoplasma pneumoniae. This unusual presentation of Mycoplasma and its management are discussed. The need to consider M pneumoniae in a patient with the adult respiratory distress syndrome is emphasized.

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Pneumonia due to Mycoplasma pneumoniae is usually a benign self-limited illness, although serious life-threatening infection has been known to occur.1-3 The findings in two patients with the adult respiratory distress syndrome and rising complement-fixation titers to M pneumoniae are presented.

CASE REPORTS

A 55-year-old man was admitted to St. Vincent's Hospital, New York, complaining of fever, chills, a productive cough, and bifrontal headache. His medical history was unremarkable. There was photophobia, a fever of 40.2°C (104.4°F), and a pulse rate of 80 beats per minute. Rales were heard in the right anterior portion of the chest and axilla. The erythrocyte sedimentation rate was 40 mm/hr, the white blood cell count (WBC) was 7,300/cu mm, and the hemocrit reading was 42.7 percent. A chest x-ray film showed an infiltrate in the right middle lobe. Gram stain of sputum showed gram-positive flora, and treatment was started with intravenous administration of penicillin G.

The patient remained febrile, and the rales and infiltrate increased. On the fourth day of hospitalization, fiberoptic bronchoscopy examination showed an inflamed and edematous right middle lobe bronchus draining purulent material. Bacterial, fungal, and mycobacterial smears and cultures showed no pathogenic organisms. Tests for febrile agglutinins and the heterophile antibody screening test (Monosport test) were negative, and the results of examination of the spinal fluid were normal. Tests for streptococci MC and cold agglutinins were negative on the second and ninth days of hospitalization.

Open lung biopsy on the eighth day of hospitalization showed active pneumonitis with preservation of alveolar septa. Cultures were negative. The patient became more tachypneic following bronchoscopic examination, and the chest x-ray film showed opacification of the entire right hemithorax. The arterial oxygen pressure (PaO2) while breathing 40 percent oxygen by face mask was 50 mm Hg. Therapy with mechanical ventilation was instituted, and the level of positive end-expiratory pressure (PEEP) providing maximum effective dynamic compliance was 12 cm H2O. The PaO2 increased to 92 mm Hg. Antibiotic therapy was changed to intravenous administration of chloramphenicol.

The fever and consolidation gradually resolved, and weaning from mechanical ventilation was accomplished. On the 19th day of hospitalization, the complement-fixation titer to Mycoplasma was 1:16, a fourfold increase over the titer during the acute phase (less than 1:4). Complement-fixation titers to adenovirus, type-A influenza virus, and respiratory syncytial virus failed to show a rise.

CASE 2

A 52-year-old man was admitted to the hospital because of fever, malaise, and a productive cough. His temperature was 39.8°C (103.6°F), rales were heard over the right midlateral portion of the chest, and there was a grade 1/6 apical systolic ejection murmur. The WBC was 13,000/cu mm, with 72 percent polymorphonuclear cells and 12 percent band forms. A chest x-ray film revealed an infiltrate in the right middle lobe (Fig 1 to 3), and Gram stain of sputum showed white blood cells without bacteria. Culture of the sputum grew normal flora. Intravenous therapy with ampicillin was started. Oxygenation deteriorated rapidly, and mechanical ventilation with PEEP was instituted.

The patient's condition began to gradually improve. On the 30th day of hospitalization, the complement-fixation titer to...