negative. The patient did not have any of the usual risk factors for severe babesiosis, except for advanced age and travel to two endemic areas. As previously stated, the classic description of severe babesiosis does not include respiratory failure or ARDS as one of its clinical manifestations. This report represents only the second documented report of ARDS following babesiosis.

The only other reported case of ARDS attributed to babesiosis occurred approximately 7 weeks after the patient received a blood transfusion contaminated with Babesia.\textsuperscript{10} This patient was admitted with an intraabdominal abscess and during surgery received a blood transfusion. She subsequently presented 6 weeks later with sepsis, and was initially treated for three days with antibiotics. On day 4, the patient was noted to have 10 percent intraerythrocytic parasitemia on a peripheral smear, confirming babesiosis. On day 9, the patient developed acute respiratory failure and ARDS requiring mechanical ventilation. She died on day 15. Postmortem examination revealed findings consistent with diffuse alveolar damage.\textsuperscript{10} A curious finding in both the currently reported patient and the initial report was the delayed onset of ARDS. In most patients, ARDS will develop within 72 h of the initial insult, and in most cases within 24 h.\textsuperscript{11} Our patient developed acute respiratory failure four days into his illness, while the other reported patient developed it after 9 days. This appears to be a unique feature of ARDS after babesiosis.

The cause of ARDS after babesiosis is unknown. Information gleaned from the study of sepsis and multiorgan failure in malaria has provided insight into possible pathophysiologic mechanisms in the related but less severe babesiosis. These include endotoxia (LPS), complement activation, immune complex deposition, cytoadherence, microembolli, and disseminated intravascular coagulation.\textsuperscript{12}

Both malaria and babesiosis are associated with elevated levels of endotoxin (LPS), increased vascular permeability, and shock in animal models.\textsuperscript{13} It has been suggested that the intraerythrocytic death of these parasites causes sensitization to endotoxin.\textsuperscript{10} The source of LPS is uncertain but may be gastrointestinal translocation of the parasite itself.\textsuperscript{14} The latter hypothesis has not yet been proven.

In both malaria and babesiosis, higher levels of parasitic density are not necessarily associated with a greater severity of disease.\textsuperscript{7,13} Our patient had 2 percent parasitemia on the peripheral smear which is similar to levels which have resulted in fatal outcomes due to babesiosis.\textsuperscript{5} During antibiotic treatment of babesiosis, the parasites may intermittently be absent on peripheral blood smear. Despite a negative blood smear, infection may persist for up to 5 weeks, indicating inadequate eradication of the organism.\textsuperscript{6} The delayed onset of ARDS in our patient may have resulted from persistent parasitic infection,\textsuperscript{14} despite rapid clearing of his peripheral blood smear. It is also possible that antimicrobial therapy resulted in destruction of organisms with enhanced release of parasitic antigens into the circulation, causing an endotoxin-like challenge and an increase in the inflammatory response.\textsuperscript{14}

In summary, we report the second case of ARDS after babesiosis. Our patient manifested the classic clinical picture of ARDS, as shown by persistent noncardiogenic pulmonary edema, severe hypoxemia requiring positive end-expiratory pressure, and low total respiratory system compliance. A unique feature of Babesia-induced ARDS is its delayed onset, greater than 72 h, following initial signs of systemic infection.

REFERENCES


Astrocytoma Presenting With Apnea and Sinus Arrest*

Natarajan Rajagopalan, M.B.B.S.; and Victor Hoffstein, M.D.

Although some vascular lesions of the central nervous system are known to cause abnormalities in the control of breathing, association between astrocytoma and combined cardiorespiratory abnormalities in the adult is distinctly unusual. We present a case of a 52-year-old man whose only features of astrocytoma consisted of episodes of apnea and sinus arrest followed by prolonged alveolar hypventilation. These abnormalities resolved after resection of the tumor. We conclude that in patients presenting with respiratory and sinus arrest,
the search for a cause should not be limited to the cardiac and pulmonary systems, but it must include a possibility of a brain tumor.  

(Chest 1994; 106:1301-03)

In a patient presenting with apnea, alveolar hypoventilation, and cardiac arrhythmia, the cause is usually assumed to be either a vascular lesion in the central nervous system, drug overdose, or primary alveolar hypoventilation. Limbic system seizures are not frequently considered in this setting. We present a patient with apnea and sinus arrest as the only physiologic signs of the limbic system seizures secondary to astrocytoma.

Case Report

A 52-year-old man presented to the emergency department because of two episodes of loss of consciousness at work. These episodes lasted a few seconds, were not preceded by any neurologic or cardiac symptoms, and were not associated with exertion. There were no postictal symptoms or signs, although on one occasion the patient complained of a mild headache. The patient denied any substance abuse (including alcohol), was not taking medications, and stopped smoking 20 years ago.

After arrival to the emergency department, the patient was observed to have two more similar episodes. The first one was very brief; the patient looked vacantly into space for about 1 s. The second episode lasted about 4 s, during which the patient was unresponsive, apneic, and pulseless. An ECG showed sinus arrest, and arterial blood gases on room air were PO2 of 67 mm Hg, PCO2 of 64 mm Hg, and pH of 7.27. The patient was given supplemental oxygen. His sinus arrest ended with a junctional escape beat followed by a sinus rhythm of 70/min. Simultaneously, respiration resumed and the patient became responsive.

Physical examination revealed a slightly drowsy, but fully oriented man in no distress. His BP was 120/70 mm Hg, heart rate of 70/min, and respiratory rate of 14/min. There were no abnormal respiratory, cardiac, or neurologic findings. Laboratory investigations—serum electrolytes, glucose, calcium, CBC count, electrocardiogram, and chest radiograph—were all normal. His arterial blood gases 8 h after the initial episode still showed marked alveolar hypoventilation with PO2 of 58 mm Hg, PO2 of 62 mm Hg, and pH of 7.29.

A temporary venous pacemaker was inserted strictly as a prophylactic measure. The patient had no further episodes of apnea or sinus arrest. Electroencephalogram performed the day after showed focal slow waves over the right temporal area. Computed tomography of the brain revealed a large mass in the right temporoparietal area. This was eventually resected surgically and the disease revealed an astrocytoma. At the time of discharge from the hospital, arterial blood gases were pH 7.40, PO2 86 mm Hg, and PCO2 42 mm Hg.

Four months after surgery, the patient presented with headaches and episodes of “staring into space,” without any further episodes of respiratory or sinus arrest. He was found to have a recurrence of the tumor that was surgically debulked and the patient was discharged to a convalescent hospital on steroids (Dexamethasone) and anticonvulsants.

Discussion

We describe a patient with apnea and sinus arrest as the initial presentation of astrocytoma, and we postulate that these physiologic abnormalities were the only manifestations of limbic system seizures in this patient.

In 1899 Jackson described respiratory arrest as a part of complex partial seizure. This was subsequently confirmed by 1971 EEG monitoring which showed that initial apnea may be an integral manifestation of partial seizures often originating in the limbic system.

Autonomic nervous system manifestations of seizures have been studied experimentally during electrical and mechanical stimulation of different areas of the limbic system in animals and in humans. Respiratory arrest has been noted after stimulation of posterolateral frontal cortex, anterior insular cortex, anterior cingulate gyrus, amygdala, uncus, and fornix, which consist of most of what we now know as the limbic system.

Kada and Jasper pointed out that during experimentally induced respiratory arrest, patients could still be conscious and responsive and, in fact, can overcome apnea when commanded to speak. Their articulation, however, was poor because of poor control of breathing. Consciousness was not necessarily lost during apneic seizures, which was later confirmed by Watanabe et al. They reported five children who had apneic attacks without loss of consciousness as manifestation of limbic system seizures. Rovner and Barron observed intermittent respiratory arrest in a patient who had epilepsy partialis continua due to occlusion of right anterior cerebral artery. Electroencephalographic recordings showed periodic spike discharge from the right frontotemporal region accompanied by respiratory arrests lasting from 5 to 8 s. There are case reports of epileptics with prolonged respiratory insufficiency not associated with tonic-clonic movements and with simultaneous EEG evidence of seizure activity.

Apnea is unusual as the initial manifestation of seizure beyond the neonatal period. Initial reports of apneic seizure described tachycardia as the associated cardiovascular response. Fenichel et al. described bradycardia accompanying as favoring nonconvulsive apnea in infants. Subsequently Coulter described partial complex seizures with apnea and bradycardia. Van Buren et al. made careful observations in both spontaneous and induced epileptic attacks and noted apnea and bradycardia.

Our patient is unusual in that he had episodes of sinus arrest and apnea without other overt features of seizure activity. Interictal EEG seldom shows seizure activity; slow waves showed in our patient merely reflect the presence of the tumor. We did consider a possibility that cardiac events (sinus arrest) led to apnea; however, no cardiac disease was shown in our patient, the pacemaker was never used and later removed, and after tumor resection there were no further episodes of either apnea or sinus arrest. To our knowledge, the combination of autonomic features that includes respiratory and sinus arrest, has not been previously reported as a manifestation of limbic system epilepsy.

Kelly et al. described an infant who had episodes of cyanosis and apnea and was later found to have astrocytoma in the left temporal lobe. Valente et al. recently described a young patient with astrocytoma who had repeated episodes of coma and apnea. This patient had stable alveolar hypoventilation with well-compensated respiratory acidosis and polycythemia, suggesting that the abnormal respiratory control was probably long standing. Our patient had only transient hypoventilation that was probably because of an electrical disturbance in the limbic system resulting in abnormal regulation of breathing.

1302

Astrocytoma With Apnea and Sinus Arrest (Rajagopalan, Hoffstein)
REFERENCES

1 Jackson JH. On asphyxia in slight epileptic paroxysms. Lancet 1899; 1:79-80
6 Rovener RN, Barron KD. A case of respiratory epilepsy. J Neurol 1966; 16:328
9 Coulter DL. Partial seizures with apnea and bradycardia. Arch Neurol 1984; 41:173-74

Cholecyst-Thoracic Fistula*

A Rare Complication of Lithiasic Cholecystitis

Miguel Angel Corrol Sánchez, M.D.; Ramón Gómez Sanz, M.D.; Arnaldo Alvarado Astudillo, M.D.; Pedro Rico Selas, M.D.; and Enrique Moreno González M.D.

A 64-year-old male patient was studied for repeated right basal pneumonia of long duration. A computed tomography scan showed a cholecystitis of concealed evolution. Surgery revealed fistulization toward the thorax, with the passage of multiple calculi of a biliary origin to the chest cavity. We report the first described case to our knowledge of cholecyst-thoracic fistula secondary to cholecystitis of long evolution.

(Chest 1994; 106:1303-04)

A biliary origin for a right basal pneumonia is rare, and after reviewing the literature, we have not come across any cases of cholecyst-thoracic fistula with passage of multiple biliary calculi toward the thorax as a complication of cholecystitis. There do exist two cases of biliary calculi migration toward the thorax, 6 months and 6 years after a laparoscopic cholecystectomy and a laparotomy.

*From the Department of Surgery, 12 de Octubre Hospital, University of Madrid, Spain.

FIGURE 1. Chest radiograph showing right basal infiltrate.

cholecystectomy, respectively, subsequent to accidental puncture of the gallbladder during the surgery.

We studied a patient who presented to the hospital with a clinical pattern of right basal pneumonia of torpid, insidious evolution, initially diagnosed as a middle lobe bronchus syndrome, when in fact it was a cholecystitis with cholecyst-thoracic fistula complications.

CASE REPORT

The patient was a 64-year old man, diagnosed 5 years ago as having lithiasic cholecystitis and requiring hospitalization. He was discharged 15 days after a satisfactory clinical evolution with conservative medical treatment because he rejected surgery. In September 1991, the patient visited the emergency room coughing up abundant purulent expectoration, having a fever of 39°C, and sharp pain in the right hemithorax. We found no accompanying digestive symptoms. The x-ray film of the thorax (Fig 1) revealed right basal pneumonia. Antibiotic treatment was initiated and the patient's clinical condition improved, although the right basal pneumonia persisted in the radiologic images. We referred the patient to the Pneumonic Service for study. Fiberoptic bronchoscopy revealed signs of bronchitis in the right bronchial system and discrete flattening of the middle lobe bronchus entrance. Bronchial biopsy showed acute necrotizing inflammation with no evidence of malignancy. Escherichia coli and Proteus mirabilis grew in the percutaneous transtracheal tap. As these germs are typical of the digestive apparatus, and in light of the previous lithiasic cholecystitis, an abdominal origin was suspected for the pneumonia. Thoracic-abdominal computed tomography scan (Fig 2) detected a right subphrenic collection continuing downward, with thickened walls and internal calculi in the gallbladder. The collection appeared to extend beyond the diaphragm.

Complicated cholecystitis was diagnosed and surgery indicated. Right subcostal adhesions were observed via laparotomy from the gallbladder area and liver to the diaphragm, hindering entry into the abdomen. Gallbladder adhesion to the diaphragm was observed, as was a perforation of the gallbladder fundus in the form of a 5-cm orifice through the right diaphragm and toward the thorax over the liver cupula. The orifice led to an anfractuous cavity of some 10X10 cm, from which multiple gallstones and pus were extracted. Exploration of the cavity verified its location over the diaphragm. Given the cavity’s complete isolation due to the inflammatory reaction, it was decided to drain via the abdominal cavity and adopt measures in anticipation of possible pulmonary lesions. The rest of the gallbladder was adhered firmly to the liver hilus. Cholecystectomy was performed. Cholangiography during the operation produced no sig-