

# Syncope as a premonitory sign of fatal pulmonary embolism

## Two case reports

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Two patients suddenly died of massive pulmonary embolism 3 weeks after hip surgery. In retrospect, several episodes of syncope starting during the first postoperative week were recognized as premonitory signs of the fatal outcome.

We wish to bring to the attention of the orthopedic community a form of presentation of pulmonary embolism that we ourselves failed to recognize. Syncope alone or in conjunction with other signs and symptoms is present in approximately 10 per cent of patients with pulmonary embolism (Sasahara 1973, Simpson et al. 1983). However, the significance of syncope in this regard is not appreciated by the majority of physicians even in teaching centers (Thames et al. 1977).

### Case Reports

**Case 1.** A 62-year-old female underwent right total hip arthroplasty for arthrosis in September 1986. The patient was otherwise in good health without evidence of high blood pressure, diabetes, lung, heart or other systemic disease. The operation was uneventful, but the postoperative course was complicated by dislocation of the prosthesis on the second postoperative day. Reduction was accomplished with sedation at the bedside and was followed by an abduction pillow and partial curtailment of our usually vigorous postoperative mobilization regime. No anticoagulation was employed.

On the fourth day after surgery, the patient complained of an episode of lightheadedness, followed by fainting while in bed. These symp-

toms recurred later that day while the patient was rolled with assistance to the right side. There was no accompanying pain, palpitations, dyspnea, or seizure activity observed. Blood pressure and EKG taken immediately after the second episode were said to be within normal limits, as was the chest radiograph. The pulse was transiently elevated to 100 from a baseline of 84. Every 2 to 3 days thereafter, brief syncopal episodes lasting no more than 20 seconds recurred both in bed and while standing or sitting. On two additional occasions, these were observed by the staff. Between episodes the patient was completely asymptomatic. Consultation with an internist failed to aid in diagnosis.

Three weeks postoperatively while being mobilized with a walker, the patient lost consciousness and slumped to the floor. She was then hypotensive with a blood pressure of 70/50, gasping for breath and with tachypnea of 28 per minute. She had distended neck veins, sinus tachycardia, and EKG evidence of right heart strain. Her oxygen partial pressure was 55 mmHg.

Emergency measures were instituted and the patient regained consciousness with vital signs returning to normal. She was started on full heparinization and transferred to the intensive care unit. Later that day she became bradycardic and again lost consciousness. Resuscitation efforts were not successful.

At autopsy the right main pulmonary artery was occluded by a large serpentine thrombus loosely adherent to the arterial wall. Multiple other smaller fresher emboli were present more distally in the pulmonary tree. The deep veins of the calf were free of thrombosis, but multiple fresh and

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organizing clots were found in all the major veins in the thigh and in the pelvis around the hip arthroplasty site. There was no evidence of myocardial infarction.

**Case 2.** In February 1983, a 74-year-old male slipped on a wet tile, sustaining a moderately displaced intertrochanteric fracture of the right femur. There was a history of myocardial infarction 8 years previously from which recovery had been uneventful. There was no history of pulmonary or deep venous disease.

On the day of admission the patient underwent reduction and fixation of the fracture with a sliding-nail plate device. No anticoagulation was used. The postoperative course was unremarkable and the patient was ambulated, weight bearing as tolerated on the second postoperative day. On the third day following surgery, the patient was observed to lose consciousness while sitting in a chair. He recovered within a minute and vital signs, including pulse rate taken soon thereafter, were within normal limits. He reported no chest pain. Chest radiographs and EKG were unchanged from preoperative values. Blood gases revealed  $PO_2$  of 59 mmHg, but this was felt to have been a venous sample and repeat value on room air was 75 mmHg – within normal limits. The following day the patient complained of dread and anxiety, but syncope did not recur. However, on the third, fourth, and fifth days, these feelings of acute apprehension were accompanied by recurrent episodes of transient syncope, usually when rising from bed, but also while sitting quietly in a chair. Tachycardia was noted after two of these episodes. Again, there was no chest pain or dyspnea. EKG, repeated on each occasion, and chest radiographs were all unchanged. Blood pressure and other vital signs remained stable. There was no clinical evidence of deep vein thrombosis. Between the brief syncopal attacks, the patient appeared asymptomatic and followed our normal postfracture mobilization routine without difficulty. The number of syncopal attacks became less frequent over the ensuing 2 weeks, occurring on the average of one every 3 days. On the twentieth postoperative day, the patient was transferred to a rehabilitation center. The following day during ambulation, he became diaphoretic and lost consciousness. Resuscitation efforts were unsuccessful.

At autopsy the right and the left pulmonary arteries were occluded by a coiled saddle embolus. The veins of the soleus sinuses in both calves were filled with fresh and organizing clots, as were the pelvic veins on the right side. There was histologic evidence of luminal narrowing of the coronary arteries and evidence of old but not of recent infarction.

## Discussion

Transient and painless syncope may appear relatively innocuous when compared with the classical and more dramatic presentations of pulmonary embolism (Dalen 1972). In fact, syncope can be the only sign, and a very ominous sign, of impending massive pulmonary embolism that demands diagnosis and treatment with dispatch.

Angiography has shown that pulmonary embolism patients who present with syncope are overwhelmingly more likely to have a massive embolism (obstructing over 50 per cent of the pulmonary vascular bed) than those patients without syncope – 82 per cent as compared with 28 per cent (Thames et al. 1977). Further, as one would expect, the incidence of subsequent cardiac arrest is also much higher in the patients with syncope – 24 per cent as compared with 1 per cent of patients without syncope (Thames et al. 1977).

Several different mechanisms have been proposed to account for the syncopal episodes in pulmonary embolism. They may be due to intermittent occlusion by a partially attached large floating clot in the pulmonary tree that transiently blocks blood flow and is influenced by changes in body position (Busch et al. 1984). This appears to have been the case in our first patient.

Alternately, syncope may be due to showers of fully embolized clots from the legs or pelvis that cause temporary pulmonary occlusion by hypotension and a resultant fall in cerebral blood flow, but then quickly break up and migrate to more distal and less vital areas of the pulmonary tree (Thames et al. 1977).

A third explanation suggests a vasovagal reflex, triggered by embolic events to give syncope on a neurogenic basis (Simpson et al. 1983).

The differential diagnosis of syncope is difficult and pulmonary embolism is not one of its most common causes (Stöllberger et al. 1986). How-

ever, in the context of the postoperative orthopedic patient, especially following surgery around the hip in which the occurrence of deep vein thrombosis is so frequent (Guyer et al. 1982), syncope must be considered a potential sign of grave consequence for the patient. The diagnosis of pulmonary embolism must then be aggressively

pursued. Full anticoagulation should begin and the possibility of emergency surgical intervention should be considered (Busch et al. 1984).

We hope that a greater awareness of syncope as an ominous sign of pulmonary embolism, gained through our unhappy experience, will lead others to a proper early diagnosis and treatment.

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