

Survey Done on Hemodialysis Centers in Los Angeles



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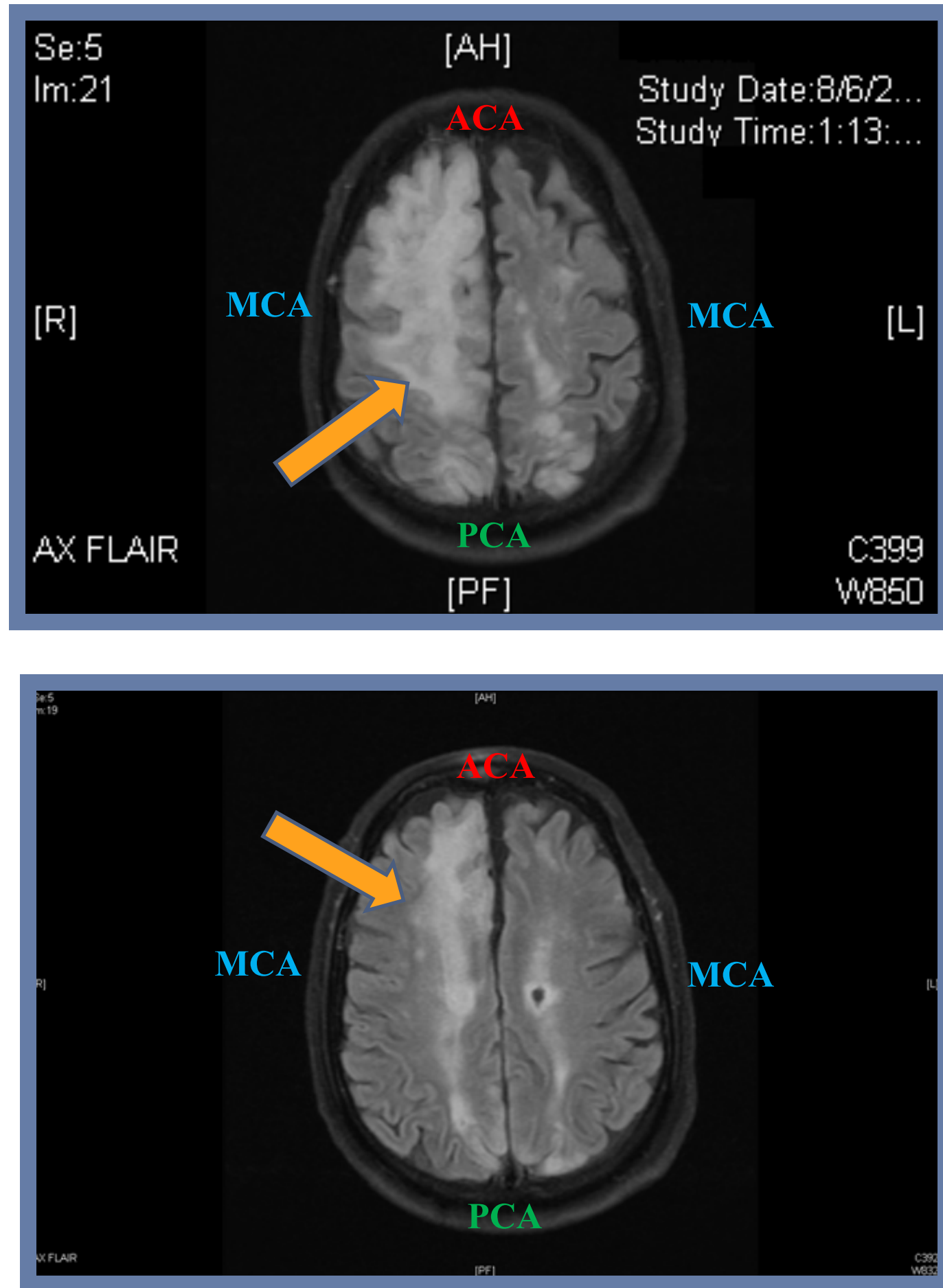
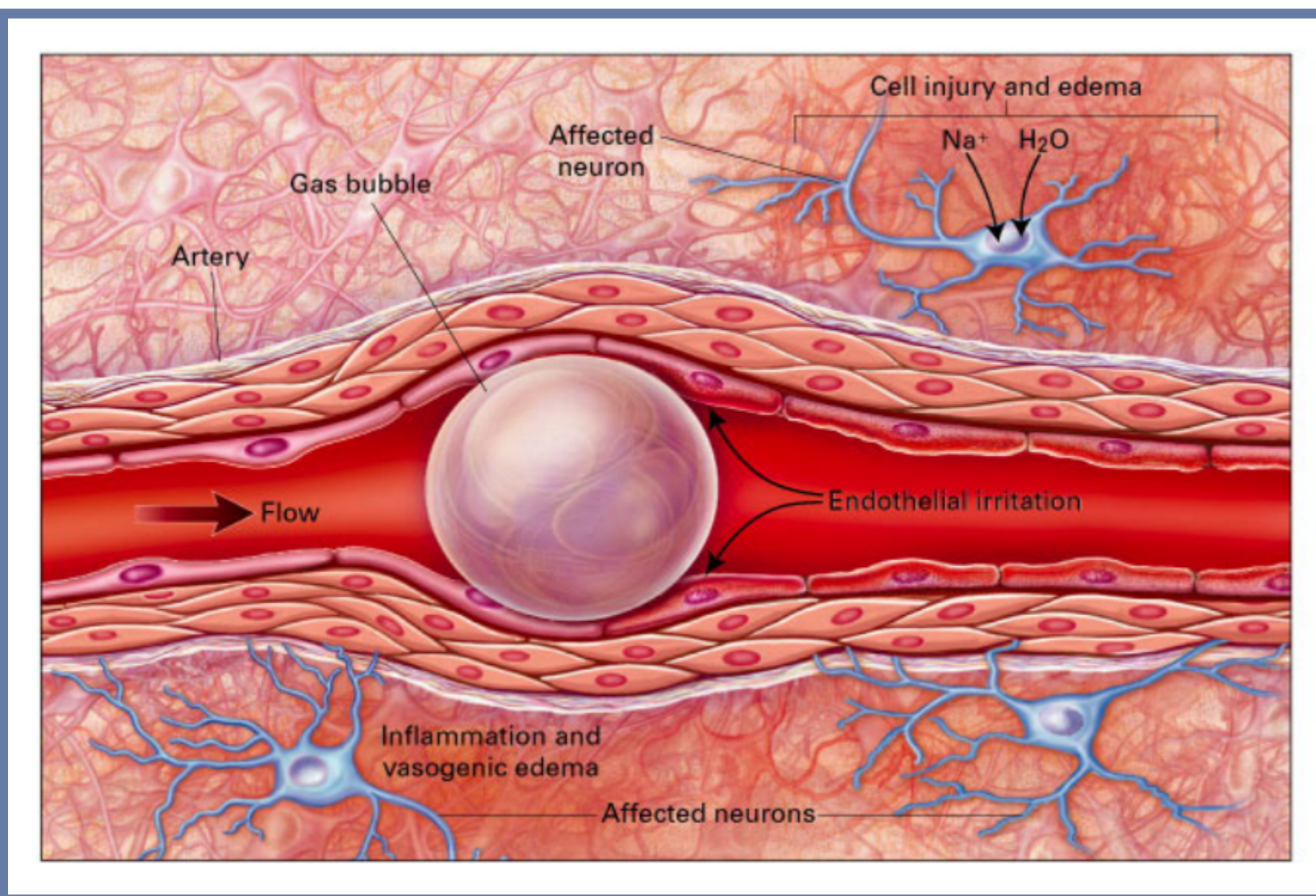
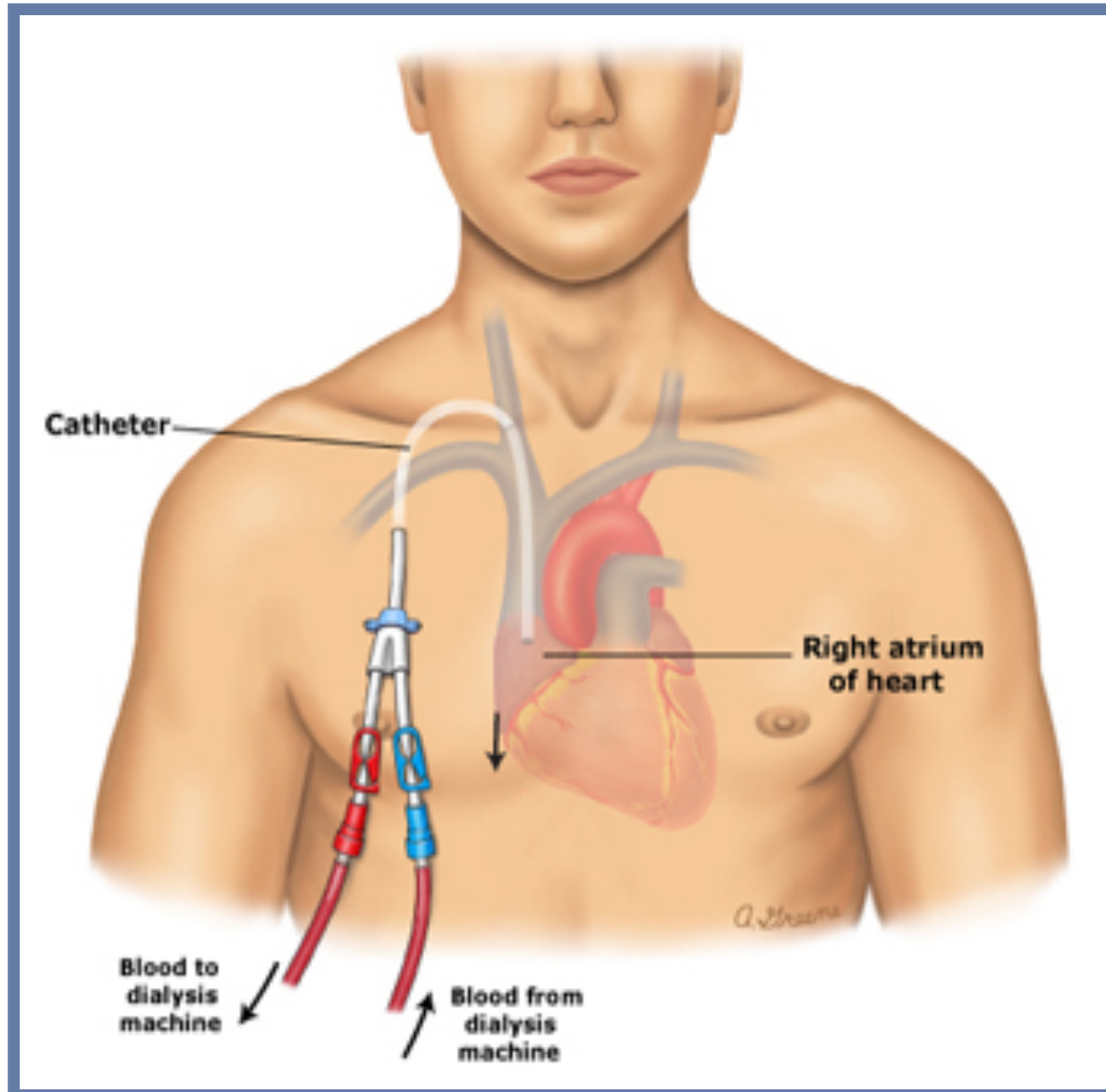
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Introduction	Case Study (cont.)	Materials and Methods	Results	References	
<p>Arterial gas embolism (AGE) can lead to severe neurological damage and/or death¹. In 2008, about 548,000 US residents underwent treatment for end-stage renal disease with 64% undergoing in-center hemodialysis. Assuming an average of 3 treatments per week, there were 1,052,160 hemodialysis treatments in 2008. According to Ward et al., over 14 months, 7 AGE accidents occurred over 14,000 hemodialysis treatments, an incidence rate of 0.05%. If we attribute this rate to 2008, AGE would present in 526 patients.</p> <p>In a recent study in Paris, Bessereau et al. found that out of 4,727,496 hospitalizations, 125 cases had proven iatrogenic gas embolism. Of those 125 cases, 24.8% (31) were strictly due to catheterizations³. This proves the pressing need for medical center staff to be able to recognize the signs and symptoms of AGE.</p> <p>AGE infusion as a result of routine hemodialysis is extremely rare. However, with the increased prevalence of end-stage renal disease and high number of hemodialysis treatments, the likelihood of its occurrence increases. Hyperbaric oxygen therapy (HBOT) is currently the most effective treatment for AGE. A survey was conducted to observe whether hemodialysis medical centers can effectively recognize AGE and appropriately refer to HBOT.</p>	<p>Hyperbaric Treatment: Patient was transferred to UCLA at approximately midnight for possible air embolism with the intent of treating with HBOT. Patient started hyperbaric chamber around 1:20 a.m. using ABT treatment table 6. Patient was monitored and left in the unit until 6:30 a.m. when he was transferred to the ICU.</p> <p>Death Summary: Unfortunately, the patient’s health continued to deteriorate. He developed multi-organ failure, cardiac shock, and severe sepsis. Patient died one week after admission.</p>	<p>A list of 68 dialysis centers in Los Angeles County was compiled from which 22 centers participated in a survey. The survey was designed to determine whether dialysis centers were able to recognize symptoms of air emboli in patients and to provide sufficient treatment. Criteria included incidence of AGE at each center, medical staff ability to recognize the signs and symptoms of AGE, and staff knowledge of HBOT as an effective treatment for AGE. Questions asked were as follows:</p> <p>•Have there been incidences of gas embolisms in patients at your center?</p> <p>(if no) •Is there medical staff present on a regular basis that can recognize signs of a gas embolism?</p> <p>•Does medical staff know that HBOT (hyperbaric oxygen therapy) is an effective treatment when encountering a patient with a gas embolism?</p> <p>(if yes) •Was the patient treated with HBOT?</p> <p>Survey was done through phone over a period of a week and a half. If a center could not complete the survey the day it was called, that center would be contacted again the next available day or at the center’s earliest convenience. Centers were generally contacted a maximum of three times after which if they did not comply the centers would be removed from the survey. All data was recorded on an excel sheet.</p>	<p>The survey was completed by allied health. No centers surveyed had previous experience with cases of air emboli in patients. 11 of the surveyed centers (50%) stated they did not know of HBOT as an effective treatment for air embolisms. 6 of the 11 (about 55%) centers were not able to recognize signs or symptoms of air embolism.</p> <div>Summary/ Conclusion</div> <p>None of the dialysis centers surveyed had any incidences of gas emboli in their patients, illustrating that such an event is indeed a rare occurrence. However, without proper knowledge on how to recognize the signs or symptoms of when an air embolism does occur, the results can be fatal.</p> <p>The survey suggests that dialysis center staff are generally inexperienced with cases of dialysis related air emboli. About 1/3 of the centers surveyed did not have regular staff able to recognize signs and symptoms of air emboli and 1/2 of the centers were unaware of HBOT as an effective treatment. With the number of hemodialysis treatments growing each year, the survey emphasizes the need to educate dialysis center clinicians about recognizing signs and symptoms of an air embolism and providing patients with sufficient treatment and education to minimize risk to patient’s health.</p> <p>Venous air emboli may be caused by the manipulation of the central venous catheter used in hemodialysis. This would include the catheter being unintentionally disconnected, improperly placed, as well as improperly removed . Arterial emboli may occur by either embolizing in the pulmonary arteries and then passing through the lungs to the arterial system, or the gas embolus can make its way through a right-to-left shunt⁵. Hyperbaric oxygen therapy has proven to be an effective treatment for air embolism and increase awareness of the benefits of HBOT will facilitate quick diagnosis and treatment.</p>	<ol style="list-style-type: none">Murphy BP, Harford FJ, Cramer FS. Cerebral Air Embolism Resulting from Invasive Medical Procedures. Ann. Surg 1985; 201: 242-245.Ward MK, Shadforth M, Hill AV, Kerr DN. Air Embolism during Haemodialysis. British Medical journal 1971; 3: 74-78.Bessereau, J, Genotelle N, Chabbaut C, Huon A, Tabah A, Aboab J, Chevret S, Annane D. Long-term outcome of iatrogenic gas embolism. Intensive Care Medicine 2010; 36: 1180-1187.Muth CM, Shank ES. Gas Embolism. The New England Journal of Medicine 2000; 342: 476-482.Blanc P, Boussuges A, Henriette K, Sainty JM, Deleflie M. Iatrogenic cerebral air embolism: importance of an early hyperbaric oxygenation. Intensive Care Med. 2002 May;28(5):559-63. Epub 2002 Mar 21.	
Case Study	<p>History: A 79-year-old male patient with a history of type 2 diabetes, hypertension, and end-stage renal disease on hemodialysis was transferred from White Memorial Hospital to UCLA Westwood Emergency Room and immediately treated with emergency hyperbaric treatment for acute gas embolism after his subclavian temporary dialysis catheter was accidentally transected during a dressing change.</p> <p>Evening of Admission: The patient was in the shower and had wet the gauze on his catheter dressing. The wife was asked to assist him in cutting the dressing. During the process, she mistakenly cut both ports on the patient’s dialysis catheter resulting in visible bleeding at the site and air being sucked into the catheter.</p> <p>White Memorial Hospital: Paramedics transferred the patient to White Memorial Medical Center at approximately 5:20 pm and initially assessed left-sided hemiparesis and right-sided deviated gaze. Upon arrival to the emergency room, patient was able to communicate and denied pain, abdominal pain, or nausea. Glasgow Coma Scale per EMS was 4-6-5. Head CT was negative for stroke but showed air in the cavernous sinus. A CT angiogram of the head and chest showed air bubbles as well.</p>	 <p>MRI Brain: Diffusion sequences show recent extensive cortical infarction involving the bilateral ACA, MCA, and PCA territories. ACA and MCA border zone infarction is seen in the bilateral hemispheres. Right hemisphere is overall more involved than the left, showing larger areas of diffusion abnormality, greater white matter edema, and sulcal effacement.</p>	 <p>Bubble Obstructing End-Arterial Flow in a Cerebral Vessel causing Distal Ischemia⁴.</p>	 <p>Central venous access catheter (CVAC); Venous air emboli can result from the manipulation of a central venous catheter.</p>	