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artery with posterior displacement of the ascending aorta and posterior anterior compression of the esophagus against the trachea. Both patients underwent bilateral magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), and magnetic resonance venography (MRV) of the brachial plexus to determine the sites of compression because the clinicians were aware of our procedure. Both patients were diagnosed with costoclavicular compression of the arterial flow to

INTRODUCTION

The circulatory system is a closed system. Any decrease in venous return increases intrathoracic, intraabdominal, and intracranial pressures. This fact may be simply observed by application of an inflated blood pressure cuff, tourniquet, or bands around a patient's upper arm visually dilating the superficial veins of the forearm.¹ The venous drainage marginated by lymphatics is diverted into the deeper fascial planes of the arm. The patient experiences the sensation of throbbing-like increased pressure from expansion of the deeper fascial planes reciprocally increasing arterial pressure.² Bicuspid valves present within peripheral veins and lymphatics along their course proximal to junctions with other veins and lymphatics assist, direct, and divert venous and lymphatic flow into other veins and lymphatics.³ Since nutrient arteries, veins, and lymphatics within fascial planes supply nerves and other structures throughout the human body,⁴ costoclavicular compression of the brachial plexus nerves compromises nutrient arterial supply and dilates veins and lymphatics, diminishing return to the heart. The resulting dilatation of the veins and lymphatics expands fascial planes (edema). Ischemia develops, and if not relieved, tissue damage follows.¹

Two patients from our database with the clinical diagnosis of thoracic outlet syndrome (TOS) presented with severe hoarseness and dysphagia.⁵⁻⁸ Both cases displayed right aortic arch and left aberrant subclavian

the brachial plexus nerves and compression of the veins and lymphatic draining the brachial plexus. One patient was selected because she had ruptured her saline breast implants. They were replaced by silicone implants, which caused fibrosis and scarring over the anterior chest wall muscles and limited motion of her upper extremities. Since it is not possible to present all of the images acquired, those selected best demonstrate the anatomy and pathophysiology.

CLINICAL HISTORY

This is a 51-year-old right-handed female who presented to her neurologist with bilateral throbbing-like frontal temporal headaches that radiated from the back of the head into her eyes. At night, headaches would often awaken her. The headaches were described as 10 out of 10 in terms of pain and occurred 1 to 2 times a month without any triggered known causes. Stress aggravated her headaches. She also had associated symptoms of nausea, vomiting, photophobia, phonophobia, and osmophobia.

Physical Examination

Findings from her physical exam include: height, 1.6 m; weight, 58.5 kg; temperature, 36.8°C; blood pressure, 115/68 mm Hg; pulse, 74 beats/min; and respiratory rate, 17 breaths/min. A review of systems pertaining to her headaches included: frank motor weakness, dysphasia, incoordination, sensory changes, low-grade tinnitus in the left ear that lasted sometimes for 3 weeks with associated diplopia, sometimes hearing loss dysarthria and vertigo. Her only medication was topiramate, 100 mg 4 times daily.