Massage Therapy for Subcutaneous Emphysema, a Case Study
Abstract

Objective: This article describes a patient who developed a moderate to severe subcutaneous emphysema post thoracic surgery. Condition was not directly treated in any way but monitored closely by hospital staff. This article aims to describe and contextualize the use of manual therapy as an option of care from the viewpoint of a Certified & Licensed Massage Therapist participating in the Mayo Clinic Hospital Based Massage Therapy Internship program during a 5 day span. Methods: Massage services were conducted in a “pay for service” environment at St Mary’s Hospital (Mayo Clinic) in Rochester Minnesota at a rate of $1.25/min. Light pressure effleurage strokes were used on bilateral upper extremities, neck and head. Massage strokes primarily addressed bilateral upper trapezius, rhomboids, deltoids, and pectoralis major. Stokes generally started at the base of the occiput moving inferior throughout the bilateral upper extremities. Stroke direction was varied using longitudinal muscle fiber strokes, cross muscle fiber directions and circular strokes over muscle groups. Patient pain levels and comments were recorded. Special considerations were given around thorocotomy incision site, IV’s, drains, and patient positioning. Results: Pre massage palpations indicated tight and restricted facia and presence of subcutaneous emphysema in bilateral upper extremities, neck and head with crepitus. As massage services progressed the density of subcutaneous air dissipated with less crepitus. Patient comments indicate massage services were beneficial in relieving “pressure” and “tightness”. Conclusions: More scientific studies and research are needed to accurately use massage therapy as the option of care for subcutaneous emphysema. However, based on audible reduced crepitus, changes palpated in affected tissues and the palpated decrease in density of subcutaneous air, more research could be legitimized. Additionally, patient comments consistently indicate relief from massage services and could be studied in a pain management setting or as a palliative care option.

Case Report

The patient is a 62-year old Caucasian woman, former smoker of over 30 years, with a history of coronary artery disease, carotid artery stenosis, hypertension and hyperlipidemia. In 2002 she received an implantable cardioverter-defibrillator. During a routine checkup of the device a 6mm nodule was discovered in her lower left lobe. The patient was scheduled for a lobectomy to biopsy the mass.

Day 1 post-surgery: Patient suffers acute right side cerebral ischemia in the small vessel territory resulting in left sided hemiplegia. Hospital staff concludes that the stroke occurred due to being taken off aspirin regimen pre surgery. Left side facial weakness is noted with moderate to severe swelling of neck and face. The patient complains of impaired eyesight with pressure and tightness in bilateral upper extremity and neck. Upon palpation, extensive subcutaneous emphysema is discovered in bilateral upper extremities, neck and face. Hospital staff concludes this is due to surgery procedures and determine it to be benign and self-limiting in nature. Patient was placed on anticoagulation medication to manage atrial fibrillation and transient ischemic attack, beta blockers for hypertension and a pain medication regimen of oxycodone.
**Day 2 post-surgery:** Patient facial swelling has not decreased and patient pain levels have increased due to subcutaneous emphysema. Patient states 2/10 pain around thoracotomy incision starting at the inferior angle of the scapula moving laterally in a convex shape to the mid axillary region. Patient reports facial swelling with impaired vision, labored breathing, pain and discomfort in bilateral shoulders and neck and requests massage services.

**Day 3 post-surgery:** Upon arrival, patient is found seated upright at bedside chair in no acute distress with family member present in the room who left at the start of the session. Patient requests massage to bilateral upper extremity and neck. Patient was unable to state pre-massage pain level commenting “it feels tight and like there’s a lot of pressure”. Supportive pillows were placed under bilateral elbow complex to promote relaxation of the glenohumeral joint and on the floor underneath bilateral feet to support the lumbar spine. Due to risks of bleeding and bruising from anti-coagulation and beta-blocker medication, a very light pressure was determined to be used for massage services. Small air pockets could be felt upon palpation throughout the entire bilateral upper extremities and neck. As very light pressure effleurage was used the subcutaneous emphysema could be felt moving throughout the tissues with crepitus. Gentle massage strokes were utilized starting at the base of the occiput continuing in a longitudinal muscle fiber direction throughout upper trapezius and deltoid to the deltoid tuberosity. These same strokes were also used in bilateral scalene, pec major, teres major and rhomboid muscle groups with the same effect. A high concentration of air could be palpated in superior upper trapezius directly inferior to the base of the occiput. During the massage the patient asked several times “Is this normal?”, “Will it go away?”. Patient’s questions were answered to best of ability within scope of practice and experience. As the massage progressed the subcutaneous emphysema began to dissipate and spread evenly throughout the tissue with less crepitus. Tissue in the areas being massaged became softer and pliable upon palpation. Breathing pattern was observed to be shallow at first and the patient was observed to be taking deeper breaths as the massage progressed. Total massage session time: 20 minutes hands-on with 10 minutes pre-post discussion. At the conclusion of the massage the patient was unable to state a post-massage pain level commenting “I feel loose and not as tight. That helped me so much.”. Patient requested to remain in current position and requested additional massage services later in the week. Family member entered the room upon departure.

**Day 4 post-surgery:** Patients medical record was reviewed in preparation for massage services. Hospital staff reported that the patient feels her left side is nearly back to complete strength and left sided facial weakness was improved. Patient still reported facial swelling with impaired vision and discomfort in bilateral upper extremity and neck with subcutaneous emphysema. Upon arrival, patients family member informs us that she was very tired from multiple tests and therapy and declined massage services asking to come back the next day.

**Day 5 post-surgery:** Nursing staff notified the department that massage services were requested by the patient stating “pain” as the reason for the request. Upon arrival the patient was found seated upright at bedside chair in no acute distress.
distress with family member present in the room who left at the start of the session. Patient requests massage to bilateral upper extremity and neck with legs and feet for relaxation purposes. Patient stated pre pain level of 0 commenting “I don’t have pain I just feel like there is a lot of pressure in my shoulders and neck”. Supportive pillows were placed under bilateral elbow complex to promote relaxation of the glenohumeral joint. Patient requested that her feet remain upright on a foot stool present by her chair. Due to no change in medications a light pressure was determined to be used prior to the session beginning to reduce the risks of bleeding and bruising. Breathing visualization exercise was used directing the patient to breathe in through the nose and visualize breathing out air trapped in subcutaneous layer. Patient’s breathing pattern was observed to be shallow at first and it was noted she was taking larger diaphragmatic breaths as the massage progressed. Facia was tight and constricted upon palpation and as gentle light effleurage was used from the base of the occiput moving caudal, subcutaneous emphysema could be palpated with crepitus. A high concentration of air was felt in the superior bilateral rhomboids and superior bilateral pec major. Gentle massage strokes moving in a longitudinal direction with the muscle fibers were used first. As the massage progressed the tissue became softer and pliable upon palpation and subcutaneous emphysema became less concentrated and more evenly distributed in the tissue. Cross fiber gentle effleurage was then used in bilateral rhomboids, upper trapezius, deltoid and pec major followed with strokes in a longitudinal muscle directed once again. During cross fiber effleurage additional pockets of air were discovered with greater crepitus. As longitudinal massage strokes were used again the air then dissipated and became evenly distributed again. Longitudinal massage strokes from the base of the occiput moving caudal were used as the patient expelled air during diaphragmatic breathing. It was observed that the tissue began to soften quicker and subcutaneous emphysema dissipated at a higher rate than in the first session. During the session the patient asked several questions such as “Does it feel any better?”, “Is there less air than before?”. Patient’s questions were answered to best of ability within scope of practice and experience. Massage was concluded with gentle light effleurage to bilateral legs and feet at the patients request. Massage oil was wiped off bilateral feet and socks were placed back on for safety while moving around. Total massage time 20 minutes hands-on (10 minutes on upper extremity and 10 minutes on bilateral legs and feet). At the conclusion of the massage the patient commented “I feel so much better and like a weight has been lifted. I feel loose and that helped me so much.” Patient requested to remain in current position and requested additional massage services later in the week. Family member entered room upon departure.

Discussion

Subcutaneous emphysema is a well-recognized and infrequent occurrence in critically ill patients from various causes and an uncommon complication following pulmonary resection or airway procedures either via video-assisted thoracoscopic surgery (VATS) or as in this case a thoracotomy. It may also develop after chest tube placement or with needle decompression of the thorax for tension pneumothorax, especially if the lung parenchyma is violated. The mechanism of SE development is air escaping from the thorax into the subcutaneous and subfacial spaces as a result of pulmonary parenchymal disruption.¹

Clinical manifestations of SE vary widely depending on its severity and extent. Patients may notice mild (and temporary) disfigurement of their body contour or experience mild to moderate pain. As in this case, subcutaneous emphysema can track to the neck or orbits and compress the globe, threatening vision.² Management options for subcutaneous emphy-

sema focus on evacuation of subcutaneous air. Treatment modalities include observation, tissue massage, incising the skin and subcutaneous fascia to create a “blowhole” to allow air to escape, fenestrated angiocatheter insertion in to the subcutaneous space, and VATS or open thoracotomy with repair of parenchymal injury.  

In this case due to the benign nature of the condition and reluctance of the patient to undergo another procedure, observation with palliative care was the choice of care. However, subcutaneous emphysema resolution varies greatly depending on the amount of subcutaneous emphysema, adequacy of control of escaping air, and method of treatment. There is a scarcity of scientific studies comparing different subcutaneous emphysema treatment modalities. With observation alone, in which air is gradually reabsorbed by soft tissues, it can take several weeks for significant subcutaneous emphysema to resolve.

More scientific research is needed for the treatment and management of subcutaneous emphysema. The objective of this article is to discuss the management options from a manual therapist perspective, techniques and palpation results with patient commentary. Additional in-depth research is required to accurately state that massage therapy is a scientifically effective form of treatment for subcutaneous emphysema. However, upon palpation the degree of subcutaneous emphysema density was noted to decrease and fascia constrictions were also decreased. As the massage progressed crepitus also decreased in the affected tissue. Possibly the most important part of the case study is the patient comments. While the patient did not present with a high pain score, her discomfort was described as “uncomfortable, tightness, and pressure” pre massage. While massage services were in process the patient commented “that feels so good, I feel like I can breathe better”. Post massage, the patient commented “I feel so much looser and the pressure isn’t as much”. Due to the self limiting benign nature of this condition patient comfort would be an important aspect of study as the majority of times a medical procedure is not necessary.

The client asked multiple questions during her massage sessions regarding the normalcy of her condition. Those same questions were asked and answered by her doctors and nurses however it is noteworthy that she looked for validation of the manual therapist.

Summary

Massage therapy for evacuation of subcutaneous emphysema has not been previously described in literature. This article reports a case in which massage therapy was used at the patients request while under observation by medical staff for relief of pressure and tightness symptoms. Restrictions and density of subcutaneous emphysema was noted to decrease upon palpation post massage. Patient comments indicate that she was provided a degree relief from her condition as a result of massage therapy. Additional clinical scenarios and studies are required to effectively evaluate the effectiveness of massage therapy at a treatment of choice however, based on this case study, there are clear benefits from a patient palliative care standpoint. It’s also interesting to note the questions the patient asked of the massage therapist.

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Although her questions regarding her condition had previously been answered by her medical team of doctor’s and nurses, she still asked for validation from the massage therapy team. She was relieved to learn that this was not the first time this condition was encountered and in previous cases the subcutaneous emphysema was self-limiting. At least, this case study shows the value of the massage therapist as part of the health care team for well-rounded patient care.

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