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Referred Shoulder Pain from Gastrointestinal Disease: Musculoskeletal Primary Care Perspective

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Abstract

Background: The occurrence of gastroesophageal reflux disease (GERD) has increased over the past two decades. It is imperative for physical therapists to perform medical screening to rule out gastrointestinal disease as a source of referred pain. This report is an example of esophageal disease contributing to shoulder pain that required a referral due to symptoms outside the scope of physical therapy practice.

Case Description: A 16-year-old female presented to therapy with a referral for a shoulder sprain. She had a history of esophageal cancer and GERD. Her shoulder ROM was normal, and she exhibited generalized strength deficits. She underwent five visits of therapy consisting of strengthening and proprioceptive training to improve stability.

Outcomes: At her 5th visit, she reported her pain increased in intensity, was constant, and worsened in supine at night. Palpation of the abdomen revealed tenderness in the medial left upper quadrant. Her symptoms demonstrated non-mechanical patterns; so, she was referred from physical therapy to her pediatrician. A gastroenterologist determined she had a hiatal hernia that was most likely referring pain to her shoulder.

Discussion: A major role of a physical therapist is to perform examination and triage to determine if a patient requires a referral to another healthcare professional. Therapists need to be cognizant of symptoms of gastrointestinal disease and perform medical screening procedures, such as system related screening questions and follow up physical examination techniques. Physical therapists should be aware of the link between GERD and hiatal hernia as a source of referred pain.

Keywords: Referred shoulder pain; GERD; Esophageal disease; Differential diagnosis

Background

The occurrence of gastroesophageal reflux disease (GERD) has been steadily increasing over the past two decades in the United States with 44% of adults reporting complications associated with esophageal disease.18 The prevalence of a hiatal hernia in patients with GERD is high and varies between 50-94% and a hiatal hernia is considered to be a marker of severe GERD [5,8].

An association between GERD and esophageal adenocarcinoma has been reported with the presence of a hiatal hernia doubling the risk of both cancer and GERD [8]. The incidence of esophageal adenocarcinoma has increased by 300-500% over the last 30-40 years, but continues to only equal 4 cases per 100,000 people per year [18]. A paraesophageal hiatal hernia is defined as the fundus of the stomach herniating upward into the mediastinum via the diaphragm through the widened esophageal hiatus [20]. Because of the high occurrence of patients who present to outpatient physical therapy for an assumed musculoskeletal injury with history of GERD related disorders, it is imperative for physical therapists to be aware of the need for medical screening to rule out the possibility that visceral disease is referring pain that appears to be of musculoskeletal origin.

There has been an increased focus on the importance of medical screening within the scope of physical therapy as we are progressing toward our professional desire for physical therapists to act as a primary care provider for musculoskeletal disorders. The Guide to Physical Therapist Practice states that one role of a physical therapist is to perform examination and triage to determine if a patient requires a referral to another healthcare professional [1]. In order to more effectively perform this role, therapists need to be able to screen for medical conditions and then refer patients to an appropriate medical professional with effective communication of the patient's signs and symptoms [3]. This all-inclusive role also requires therapists to be able to perform a combination of interview and examination techniques for medical screening as necessary to determine if the cause of pain is musculoskeletal in origin or possibly referred from medical disease [3]. Referred pain is described as pain occurring at a site distant from the area of specific tissue damage [9,19]. The convergence-projection theory of referred pain is described as afferent input from the viscera converging on the same somatic neurons at the spinal cord, which would cause the input to the spinal cord to be misinterpreted from point of origin [9,19]. It has been reported that less that 5% of primary care physicians routinely screen for red flags in their initial patient screen, which combined with direct access patient care, places a physical therapist as the primary investigator for potential serious pathology [17]. It is the role of a physical therapist to be able to recognize red flags and symptoms that could indicate a serious pathology or non-musculoskeletal origin of pain and refer a patient to their physician or other medical professional if these symptoms are present [3]. There is a general lack of research regarding gastrointestinal dysfunction and the possibility of this dysfunction causing referred pain to the shoulder. This report focuses on a case that is an example of a combination of esophageal disease and hernia contributing to left shoulder pain that required a referral to the patient's pediatrician due to symptoms outside the scope of physical therapy practice.

Case Description

A 16-year-old female presented to therapy with a referral from her primary care pediatrician stating she had a left shoulder sprain. The injury occurred when she was playing with a friend and her arm was twisted behind her back. She was active in the JROTC program at her high school until recently when her shoulder pain began. She obtained a radiograph and MRI of her left shoulder two months after the injury, which were unremarkable. She had a history of esophageal cancer, GERD, frequent migraines, severe allergies, asthma, and anemia. During the physical therapy examination, she reported she had recently been having non-specific low back pain and was referred to her primary care pediatrician to rule out metastatic cancer. This is because a previous history of cancer has a very high specificity (0.98) for presence of metastatic cancer and patients with a history of cancer and low back pain should be considered to have cancer unless proven otherwise [6]. She had a radiograph of her low back that was unremarkable and was referred back to therapy to continue treatment of her low back and shoulder. She completed a QuickDASH disability questionnaire and scored 52.57.

The QuickDASH measures the amount of disability caused by the shoulder, arm, or hand symptoms. The index is scored from 0-100 with 0 indicating minimal disability and 100 indicating complete disability. The QuickDASH has been found to be reliable, valid, and responsive to change to establish outcomes in patients with shoulder pain [10,14,16]. She reported her shoulder pain to be 5/10 at rest and 9/10 with active movements of her upper extremity on the Numeric Pain Rating Scale (NPRS) where 0 was no pain and 10 was the worst pain imaginable. The NPRS has been found to have acceptable responsiveness and construct validity [14,21]. She described her shoulder pain as a stabbing or throbbing pain that occurred in both the anterior and posterior aspects of her shoulder. Activities that aggravated her shoulder pain were picking anything up off the ground, playing her trumpet, pushups, jumping jacks, reaching overhead, reaching behind her back, and making her bed. She reported rest with a heating pad or using a lidocaine patch provided moderate relief for her pain.

The patient had forward head and anteriorly rotated shoulders and an ectomorphic body type. The cervical spine was cleared for radicular symptoms using tests for range of motion and segmental mobility. All special tests of the shoulder were negative with exception of a positive result for Yergasons test. Yergason's test has been found to be specific for biceps pathology, but it lacks sensitivity [13]. Refer to Table 1 for physical examination findings from initial evaluation. The patient demonstrated altered scapular positioning where the medial border was more prominent dorsally and scapular dyskinesia when performing active movements bilaterally. Altered glenohumeral rhythm was evident with excessive scapular movement when performing active forward elevation, possibly due to muscle weakness or proprioceptive dysfunction. Patient reported left shoulder pain rated 7-9/10 with all active movements during the examination.

TABLE 1: Physical Examination Findings.		Left	Right
Glenohumeral Active Range of Motion (AROM)	Flexion	170°	170°
	Abduction	170°	170°
	External Rotation	70°	70°
	Functional IR	To T3	To T3
Manual Muscle Testing	Flexion, External Rotation, Serratus Anterior, Rhomboids, Lower/middle trapezius	4-/5	4-/5
	Abduction, Internal Rotation, Biceps, Triceps, Wrist	4/5	4/5

Since the patient had full active range of motion and normal accessory motion, treatment began with rotator cuff and peri-scapular strengthening to improve dynamic shoulder stability. She was educated on the importance of posture to improve glenohumeral dynamics with activity [12]. She demonstrated poor activity tolerance and progressed through the phases of conservative rehabilitation with minimal irritation to the healing tissue. Neuromuscular re-education exercises were added consisting of rhythmic stabilization at varying shoulder and elbow positions to improve likelihood of achieving favorable outcomes [2].

Outcomes

The patient attended 5 visits of physical therapy for her shoulder with several cancellations due to severe migraines. Over the course of therapy prior to her last visit, she had a mild improvement on the QuickDASH, small decrease in shoulder pain to 3-4/10 on the NPRS, and she scored 2 on the Global Rating of Change Scale indicating she was "A little bit better" (Table 2). During her 5th visit of therapy, she reported her shoulder pain had recently increased in intensity to 7/10 with no known cause and was more constant in nature. Upon more in depth questioning by the therapist, the patient stated she had pain that originated in the anterior portion of her left shoulder and radiated down her lateral trunk, the pain worsened in the supine position and was worse at night when she was trying to rest. Further medical screening revealed she had general tenderness to palpation in the medial left upper quadrant of her abdomen under the caudal border of her ribs during physical examination. No abnormal accumulation of fluid was noted in the abdomen.

Her symptoms began to demonstrate patterns that were non-mechanical in nature; so, she was referred to her pediatrician and therapy was placed on hold. Her primary care pediatrician referred her to a gastroenterologist who performed a barium swallow test, where it was determined that she had a hiatal hernia that was most likely referring pain to her shoulder. A barium swallow is considered the gold standard of diagnosis for a hiatal hernia where the findings typically show an "upside down" stomach within the chest with the gastroesophageal junction located infradiaphragmatically [20]. She underwent a hernia repair, and the therapist followed up with her 6 weeks after surgery via the telephone. The patient's mother said that her shoulder pain had completely resolved after surgery, but her back pain had increased because she had a large incision across her abdomen and had to remain sedentary for the past 6 weeks.

TABLE 2: Comparison of Outcomes from Evaluation to Discharge.

Outcome Measurement	Initial	Discharge
QuickDASH	52.57	38.63
GROC	N/A	2
NPRS	5/10	7/10

Discussion

This patient initially responded to therapy as would be expected for a left shoulder sprain. Her pain was exacerbated by specific aggravating activities and was lessened by rest indicating her pain had a mechanical component. She was improving her exercise tolerance, and the intensity of her shoulder pain had decreased. However, after a few weeks her symptoms changed and no longer fit into a mechanical pattern. Her pain became more constant in nature, increased in intensity, and worsened when lying in the supine position while resting at night. It has been reported that pain that is worse with rest instead of activity, pain that is worse at night and not relieved by any position, poor response to conservative care, or poor success with comparable treatments could be indicative of serious pathology and should cause a therapist to perform more in-depth medical screening [17]. Abdominal palpation was performed to aid clinical decision making in regards to this patient. She reported generalized tenderness to palpation in the left upper quadrant of the abdomen indicating possible visceral disease. Abdominal palpation or percussion has been reported to be an integral portion of a physical therapist's medical screening examination to rule out local visceral structures and ensure that the therapist is practicing responsibly [2].

The clusters of findings this patient exhibited were atypical for a shoulder sprain and were of a non-mechanical nature. The abnormal symptoms caused concern indicating it was prudent for the therapist to refer the patient to her primary care pediatrician with the list of clinical findings for her to receive a medical examination, and the ultimate medical diagnosis of hiatal hernia was reached. It is quite possible that a combination of shoulder pain after her injury in addition to visceral disease resulted in the patient's overall initial shoulder symptoms.

It is conceivable that the hiatal hernia and scarring from previous thoracotomy for esophageal cancer caused irritation to the diaphragm and resulted in referred pain to her left shoulder by the phrenic nerve. The stomach and the esophagus can both refer pain to the shoulder through their contact with the central portion of the diaphragm [9,19]. The central portion of the diaphragm and the shoulder share an innervation from cervical segments C3-C5 and irritation of the left phrenic nerve would refer pain to the left shoulder. It has been suggested that diaphragmatic irritation is the most common cause of referred shoulder pain from the viscera [19]. Because the patient had an actual injury and obtained some improvement in shoulder pain with physical therapy, another theory for the referred pain could be that convergent afferent input from her viscera and her shoulder made her more likely to experience pain or intensified the pain that was present. A reduction in afferent input of pain from the shoulder through physical therapy treatment could have allowed her to experience less overall pain perception, even though the visceral source was still present [19]. The cause of this patient's shoulder pain was not ultimately indisputably established to be due to the hiatal hernia. However, the findings of a hiatal hernia being present, history of thoracotomy, and relief of her shoulder pain after surgical repair of the hernia indicate that systemic disease was a possible cause of her shoulder pain and symptoms. Due to the large predominance of patients with esophageal disease in physical therapy practice, it is important for physical therapists to be cognizant of the signs and symptoms of visceral disease that could be masquerading as a musculoskeletal injury. It is also necessary to be aware of the link between GERD and probability of a hiatal hernia in patients with diagnosis of shoulder pain. If a patient has a history and symptoms consistent with possible irritation of the diaphragm via a GERD related disorder, there are four main inquiries you could make to assist the process of differential diagnosis: 1) Does the patient have history of gastrointestinal issues? 2) Does the patient have pain in the abdomen or increased shoulder pain with deep breathing, lying down, coughing, or sneezing? 3) Is there any change in pain after eating meals or a dry cough at night? 4) If the patient has pain with shoulder flexion or abduction in standing, do they still have pain if they perform the motions in a slumped position to avoid changing the shape of the ribcage and therefore taking pressure off the diaphragm? The conclusion of possible referred pain from the diaphragm would also gain strength for an adolescent patient if they had recently experienced weight loss, dehydration, anemia, dysphagia, wheezing, or persistent sinusitis [7].

Patients can seek physical therapy care through direct access in many settings, and therapists should be cognizant of medical screening procedures, such as system related screening questions and follow up physical examination techniques to identify the presence of systemic disease that may cause referred pain. It is essential for physical therapists to perform a multi-factorial examination and monitor response to treatment to be able to perform a timely referral to another healthcare practitioner if the patient has symptoms outside the scope of physical therapy practice.

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