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DIAGNOSING A HEMATOPOIETIC MALIGNANCY DURING SHOULDER ARTHROPLASTY: A CASE REPORT

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Abstract

Introduction. Determining the cause of shoulder pain requires is usually a challenge as many problems; such as rheumatoid arthritis, osteoarthritis, osteonecrosis, rotator cuff arthropathy, traumatic arthritis, fractures, conditions of cervical vertebra and neoplasms, can produce similar symptoms. The diagnosis is usually regarded incidental however, CLL diagnosis by histopathological evaluation performed on lymph nodes excised during a shoulder procedure has not been reported in literature, to the best of our knowledge. We share our experience on a CLL – small lymphocytic lymphoma (SLL) case diagnosed incidentally during reverse shoulder arthroplasty in this report. Case report. We report a case of a 69-year-old woman diagnosed with chronic lymphocytic leukemia - small lymphoblastic lymphoma, subsequent to excision of an cephalic lymph node which was incidentally determined during shoulder arthroplasty. Conclusion. Upon admission, patient had no history of malignancy, no pathologic findings on physical examination and only had proximal humerus nonunion determined on radiographs.

Key words: shoulder arthroplasty; leukemia; lymphoma; lymph node; incidental.

Introduction

Determining the cause of shoulder pain requires is usually a challenge as many problems; such as rheumatoid arthritis, osteoarthritis, osteonecrosis, rotator cuff arthropathy, traumatic arthritis, fractures, conditions of cervical vertebra and neoplasms, can produce similar symptoms [1]. Reverse shoulder arthroplasty is a popular option in massive irreparable rotator cuff tears, multi-fragmented proximal humerus fractures and revision shoulder arthroplasty [2]. The preferred approach for shoulder arthroplasty is usually deltopectoral, which involves visualization of the cephalic vein [3]. Cephalic vein’s anatomic course is known to be in close relation with the lymphatic system and shoulder region is rich of lymph nodes [4, 5]. Chronic lymphocytic leukemia (CLL) is the most common leukemia type and patients are usually asymptomatic upon admission. Increased white blood cell count, lymphocyte count are usually the findings that lead to diagnosis. Fever of unknown origin, loss of weight, palpable lymph nodes are amongst less common clinical findings in CLL [6].
The diagnosis is usually regarded incidental however, CLL diagnosis by histopathological evaluation performed on lymph nodes excised during a shoulder procedure has not been reported in literature, to the best of our knowledge. We share our experience on a CLL – small lymphocytic lymphoma (SLL) case diagnosed incidentally during reverse shoulder arthroplasty in this report.

Case report

The case review was conducted according to all guidelines outlined in the Declaration of Helsinki. Written informed consent for publication was obtained from the patient nearest relative.

Sixty-nine-year-old female who had a history of type 2 diabetes mellitus, hypertension and congestive cardiac failure was presented to our outpatient clinic with left shoulder pain. Left proximal humerus fracture was diagnosed a year prior, and an ongoing limited range of motion was noticed. After the radiographic evaluation, a proximal humerus non-union was revealed (Fig. 1A). Reverse shoulder arthroplasty was opted as a treatment strategy by evaluating the status of the joint and functional expectations of the patient. In preoperative evaluation, there were no fever, cough or other symptoms that could be relatable to a chronic inflammatory condition. Routine preoperative bloodwork was unremarkable.

Figure 1: Patient had non-union at proximal humerus (A). Postoperative radiograph after reverse shoulder arthroplasty is shown (B).
Patient underwent reverse shoulder arthroplasty with deltopectoral approach, in beach-chair position. During surgery, a 2.5x1.5x1 cm sized lymph node with irregular surface and off-white color was observed near the left cephalic vein (Fig. 2). Lymph node was excised and sent for pathologic evaluation. Surgery was carried on with no complications (Fig. 1B). Patient had no early postoperative complications and was discharged two days after.

**Figure 2:** Intraoperatif, a 2.5x1.5x1 cm sized lymph node with irregular surface and off-white color was observed near the left cephalic vein

In the histopathological examination of the excisional lymph node biopsy, there were a diffuse infiltration and effacement of normal lymph node architecture with small-medium sized lymphocytes with scant cytoplasm, clumped chromatin, and indistinct or absent nucleoli which is representative for prolymphocytes and paraimmunoblasts. Immunohistochemical stainings proved the B lymphocytic infiltration with diffuse CD20 positivity. These cells showed CD5, and LEF-1 coexpressions; and cyclin D1 and SOX11 negativity. CD23 was positive in dendritic cells of residue lymphoid follicles. CD3 staining was observed in residue T-lymphocytes. The lymph node biopsy result was reported to be CLL – SLL (Fig. 3). Patient was free of orthopedic complaints at her final evaluation, and was consulted with the hematology department to receive CLL-SLL treatment. In the
follow-up performed in the hematology department, 2 1x1.5 cm eraser-like LAP in the right anterior cervical chain, 1x1 cm LAP in the left posterior cervical chain, 2 1x1 cm LAP in the right axillary region, and 1.5 cm LAP in both inguinal areas were detected. No hepatosplenomegaly was detected during the follow-up.

**Figure 3:** H&E stained diffuse, small prolymphocytes (A: magnification 40x, B: magnification 100x).

**Discussion**

Most affected group in CLL, is the geriatric population [7]. Diagnosis of CLL is usually incidental as it lies dormant for long periods of time. Identifying incidental lymphocytosis or lymphadenopathy, which is seen in 50% to 90% of patients, are the most common clues for diagnosis. However, in the reported case, we have not palpated lymphadenomegaly or spotted lymphocytosis upon admission to orthopedic outpatient clinic. Diagnosis relied on incidental lymph node biopsy performed after clinical suspicion. Some authors argue that malignancies may interfere with fracture healing and should be regarded as a factor of bone destruction, thus non-union in the presented case may actually be due to malignancy itself [8].

There are reports of incidental CLL diagnosis from lymph node biopsies during pelvic and abdominal procedures such as; radical prostatectomy [9, 10], in which the rate of incidental diagnosis has been reported to be 0.3% [1]; splenic rupture [7]; chronic cholecystitis [11]. Incidental biopsies resulting in CLL diagnosis has also been reported in tissue samples from, lung, oral cavity, orbital sinus [12-14]. Extremity involvement is exceedingly rare, where reported cases were diagnosed with biopsies following pathologic fractures of proximal femur and radius [15]. In rare cases, patients present with shoulder
pain can have underlying lymphoma. However, almost all reported patients were diagnosed with non-Hodgkin lymphoma [5, 16].

**Conclusion**

Conclusions to be drawn by an orthopedic surgeon from this report are; firstly, that elderly patients presenting with non-union should be questioned for B symptoms such as fever, night sweats and weight loss. These symptoms are usually vague and could be easily missed by even experienced surgeons. Secondly, lymph nodes surrounding the non-union site should be examined thoroughly. Finally, despite extremity involvement is exceedingly rare, any suspicious LAP encountered during orthopedic surgery should be excised and be sent for pathological evaluation. A strong collaboration with the pathologist is necessary to increase the accuracy of diagnosis. Careful management following identification of a pathologic lymph node during dissection may lead to an early diagnosis and have a direct effect on ultimate survival.

**Figures**

![Figure 1: Patient had non-union at proximal humerus (A). Postoperative radiograph after reverse shoulder arthroplasty is shown (B).](image-url)
Figure 2: Intraoperatif, a 2.5x1.5x1 cm sized lymph node with irregular surface and off-white color was observed near the left cephalic vein.

Figure 3: H&E stained diffuse, small prolymphocytes (A: magnification 40x, B: magnification 100x).
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