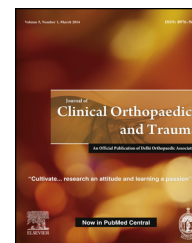


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Review Article

Dorsal wrist ganglion: Current review of literature

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ABSTRACT

Ganglion cyst is the most common soft tissue tumour of hand. Sixty to seventy percent of ganglion cysts are found in the dorsal aspect of the wrist. They may affect any age group; however they are more common in the twenties to forties. Its origin and pathogenesis remains enigmatic. Non-surgical treatment is unreliable with a high recurrence rates. Open surgical excision leads to unsightly scar and poor outcome. Arthroscopy excision has shown very promising result with very low recurrence rate. We reviewed the current literature available on dorsal wrist ganglion.

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1. Introduction

Ganglion cysts are benign soft tissue tumours most commonly encountered in the wrist, but which may occur in any joint. They may affect any age group; however they are more common in the twenties to forties. A history of trauma is elicited in at least 10% of cases and is considered a causative factor although the pathogenesis remains unclear. Incidence in males is 25/100,000 and in females 43/100,000. Prevalence is 19% in patients reporting wrist pain and 51% in the asymptomatic population.¹ Sixty to seventy percent of ganglion cysts are found in dorsal aspect of wrist & communicate with joint via a pedicle (Fig. 1). This pedicle usually originates not only at the scapholunate ligament,² but also may arise from a number of other sites over the dorsal aspect of the wrist capsule. Thirteen to twenty percent of ganglia are found on volar aspect of wrist, arising via a pedicle from radio

scaphoid- scapholunate interval, scaphotrapezium joint, or metacarpotrapezium joint, in that order of frequency.³ Ganglia arising from a flexor tendon sheath in the hand account for approximately 10%. Occurrence in other joints as well as intraosseous and intratendinous ganglia are much less common (Fig. 2).⁴

Microscopically, the pedicle contains a tortuous lumen, connecting cyst to the underlying joint. The presence of this connection is supported by the intraoperative and arthrographic findings of Angelides and by Andren & Eiken who demonstrated movement of intra-articular contrast from the radiocarpal joint into ganglia in 44% of patients with a dorsal wrist ganglion and 85% of patients with volar wrist ganglion. As contrast does not appear to travel from the cyst into the joint, a one-way valve mechanism has been postulated.⁵ Such a one-way valve is thought to be formed by the number of small “micro-cysts” present in the tissue surrounding the pedicle. These “micro-cysts” communicate with the primary

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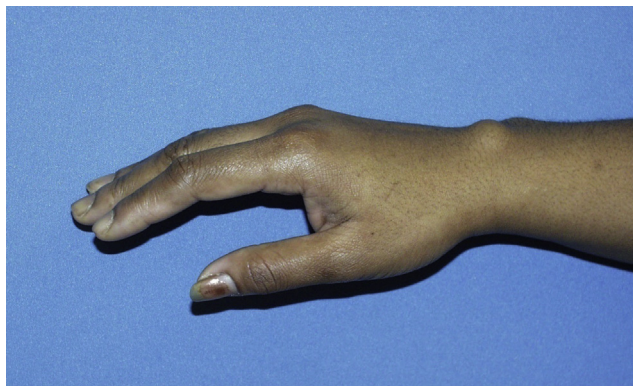


Fig. 1 – A typical dorsal wrist ganglion.

ganglion and are felt to be part of the tortuous pedicle lumen, connecting cyst to joint, and in the process creating one-way valve mechanism.⁶ Evaluation via electron microscopy demonstrates the wall of the ganglion to be composed of randomly oriented sheets of collagen arranged in loose layers, one on top of another. Since no synovial lining exists in these structures, they cannot be classified as true cysts.^{7,8} Though there are focal areas of mucinous degeneration in the cyst wall, neither significant global degenerative changes necrosis nor inflammatory changes within the pseudocyst or surrounding tissues have been demonstrated.^{9–11}

Origin of the ganglion itself remains as enigmatic as the origin of its fluid. Theories on cyst genesis have been difficult to prove and most are unable to account for all of the known features of the ganglion cyst. The concept that the cyst is a

simple herniation of the joint capsule is difficult to support in light of the lack of synovial lining within the cyst itself. The theory that ganglion have an inflammatory aetiology has been debunked by pathologic studies showing no pericystic inflammatory changes.^{12–14} There are many other theories, which have been propagated and may warrant consideration. In the first, joint stress (acute or chronic) may lead to a rent in the joint capsule and allow leakage of synovial fluid into the peri-articular tissue. Subsequent reaction between this fluid and local tissue results in the creation of the gelatinous cystic fluid and the formation of the cyst wall. In support of this “capsular rent” theory, some authors have postulated that pre-existing joint pathology (periscaphoid ligamentous injury, etc.) is the underlying cause of rent/cyst formation. Joint abnormalities are thought to lead to altered biomechanics, eventual weakening of the capsule, and finally leakage of fluid, and cyst formation. However, despite arthroscopic findings confirming the presence of intra-articular joint pathology in 50% of ganglion patients, no correlation between this pathology and postoperative cyst recurrence can be demonstrated. This leads some to conclude that intra-articular pathology is not the inciting event in the “rent” theory of ganglion formation. Alternatively, joint stress may lead to mucinoid degeneration of adjacent extra-articular connective tissue with subsequent fluid accumulation and eventual cyst formation. Lastly, some believe that joint stress may stimulate mucin secretion by the mesenchymal cells detected by electron microscopy in the surrounding tissues. The final common pathway of all of these theories is the coalescence of small pools of mucin to form the main cyst. Production of the surrounding pseudo capsule is induced by an unknown mechanism, though possibly from compression of surrounding tissues.^{10,15–18}

2. Clinical feature

On examination, wrist ganglion are usually 1–2 cm cystic structures, feeling much like a firm rubber ball that is well tethered in place by its attachment to the underlying joint capsule or tendon sheath. There is no associated warmth or erythema and the cyst readily transilluminates. The clinical presentation is usually adequate for diagnosis, except in the case of “occult wrist ganglion” where MRI and ultrasound are needed to make a diagnosis. Symptoms include aching in the wrist that may also radiate up the patient’s arm, pain with activity or palpation of the mass, decreased range of motion and decrease grip strength. The dorsal wrist ganglion is most easily palpated in a position of volar flexion. Volar ganglia may also cause paraesthesia from compression of the ulnar or median nerves or their branches.^{9,19} Patients seek treatment when these ganglions become associated with pain, weakness, interference with activities, and an increase in size.⁹ The cause of pain is unknown but, in the case of dorsal ganglia, it has been postulated to be from compression of the terminal branches of the posterior interosseus nerve.²⁰ There is some difference of opinion as to the frequency of pain. Painless mass is the most common presenting complaint.⁹ Less than one third of patients in their study reported pain and that too was invariably mild. On the other hand, various other studies

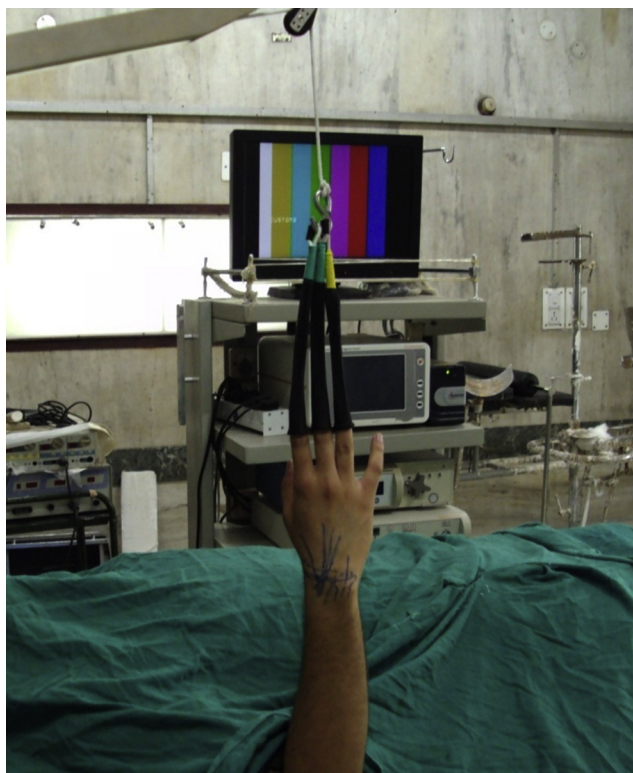


Fig. 2 – Set up for wrist arthroscopy.

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