

BAKER'S CYST



“Pallas and the Centaur”, Tempera on canvas, Sandro Botticelli, c. 1482, Galleria degli Uffizi, Florence.

The legends of Centaurs are very ancient. Like so many other mythical beings their origins are lost in pre-literate civilizations, many thousands of years old. Centaurs were fantastical creatures and like so many other mythical creatures - fauns, capricorns, unicorns, minotours, griffons, sphinxes, harpies, mermaids - were fabulous hybrids. Centaurs had the head and torso of a human and the body of a horse. The oldest archaic stories of Centaurs are Greek. It was said that a certain Ixion, a son of Ares the god of war, (Mars to the later Romans), was the first human to kill a relative; an interesting foundation story perhaps to the Biblical story of Cain and Able. Both mortals and the gods of Olympus were outraged and demanded Ixion's immediate execution. It appears however he was pardoned by Zeus himself, who seemed to hold a suppressed admiration for the hot headed youth. Perhaps Zeus saw some of himself in the youth - just exactly how much he was soon to find out! Now having taken a positive liking to the young man he invited him to a sumptuous feast with the gods. During this feast however Ixion flirted outrageously with Zeus's wife Hera. At first Zeus simply ignored this behavior, taking it all as a great joke; but as the evening wore on he realized that Ixion was completely infatuated with his wife, even though she was a much older woman. He grew angry and decided to test Ixion. He gathered in a vast amorphous cloud, and formed it into a living woman, Nephele, who perfectly resembled his wife Hera in every way. He then contrived a circumstance that allowed Ixion to be alone with Nephele. Ixion, presented with this most unexpected opportunity of being alone with who he thought was Hera, Queen of Olympus, was overwhelmed by his lust for her and immediately raped her. Zeus's fury at the ungrateful youth was ungoverned. He cursed the union and flung Ixion into the Tartarus, the very center of Dante's Hell. There for eternity he was bound to a wheel and roasted over the flames for his unpardonable insult to Zeus.

Nephele had become pregnant by Ixion, and as the union was cursed, she eventually gave birth to a hybrid monster, half human, half horse. This offspring's name was Centaurus. He was the first Centaur and the forefather of all Centaurs. This race of Centaurs dwelt on the very fringes of the known world, unable to live with humans or any other creature, as they were born of a union of violent lust. They were powerful and greatly feared creatures, predators and warriors, the most famous of all, being Sagittarius, the archer. They were passionate, unreliable, impulsive, irrational and ungovernable. And yet as the centuries passed, there were some centaurs that did become civilized and some even greatly respected by both mortals and gods alike. The most famous of these was Chiron. He was renowned as a very great doctor, and teacher. Many Greek soldiers wounded in the Trojan War would be saved by his herbal medicines.

In absolute contrast to most of his fellow Centaurs, Chiron was someone who could be completely trusted. In fact he became so revered that not only mortals, but the gods themselves sought his advice and entrusted their own children into his care and tutelage. The great Sun god Apollo sent his son Asclepius to study medicine under Chiron. Asclepius was a dedicated and diligent learner and would later become the god of Medicine. Chiron was also the teacher of many of the demigods, including Jason of the Argonauts, Actaeon, and most famously of all, Achilles. At the very height of his renown however Chiron was tragically, though accidentally, struck down by the great hero Heracles. Heracles had been visiting the land of the Centaurs. Fueled by an excess of strong wine, he got into a furious argument with one particularly volatile Centaur by the name of Pholus. Pholus challenged Heracles to mortal combat and Heracles responded in the best way he knew how - extreme violence. He began to kill all of the Centaurs

around him including Pholus, with his arrows, all of which had been dipped in the terrible poison of the Hydra. This poison caused certain and agonizing death. Tragically a stray arrow struck Chiron in the heel. Heracles was shocked, and dropped his bow, rushing to the assistance of the one Centaur he greatly admired. He tearfully apologized and frantically did all he could to give assistance to Chiron. By now however Chiron was in agonizing pain. As Chiron was an immortal Centaur, a gift he had been given by the gods, he could not die and his suffering became excruciating and unbearable. Zeus from Olympus, seeing the tragic events unfold finally felt sorrow for the Centaurs, but Chiron in particular. He reached out and took Chiron from his Earthly existence and granted him instead a heavenly, and pain free, immortality by placing him among the Constellations of the heavens. Only one other Centaur was ever so honored by the gods - the great archer, Sagittarius. The sprawling Constellation of Centaurus lies close to that of Lupus, the Wolf, and Ara, the Altar. Eratosthenes wrote that this showed us the ongoing virtue of Chiron, he gave grateful thanks to the gods for his deliverance from the Hydra's agonizing poison by the sacrifice of a wolf on the altar. In the Southern Hemisphere we also see that Chiron lies near, as if to protect from the Wolf, the Constellation of the great celestial symbol of that Hemisphere, the Southern Cross, unknown to those in the Northern Hemisphere in the time of Heracles.

Modern scientific thoughts on the stories of Centaurs are profoundly interesting. Many suggest that they may reflect humanity's very earliest consciousness of the domestication of the wild horse. If correct then the origin of stories of Centaurs could be very much older than the times of the archaic Greeks - perhaps as old as the fourth millennium BC when we find the first evidence for the domestication of the horse on the steppes of central Asia, in current day Kazakhstan - then very much on the periphery of the "known world"! Theories hold that the natural first impression a "primitive" people who had never before seen a horse, much less one with a human rider, would be that of terrifying hybrid creature - half human - half "something else", especially if viewed from a distance. Fascinatingly we have confirmatory evidence of this theory from modern, (modern in relative terms), history. The early Sixteenth Century Spanish Conquistador, Bernal Diaz, who fought with Hernan Cortez, left a detailed account of the invasion of the Aztec Empire. The Aztecs had never before seen a horse. He recorded the terror the natives felt on first seeing the Spanish cavalry, many fully believed they were being attacked by a hybrid race of half humans - half - "something else" - perhaps what the first Europeans who encountered riders from the Asiatic steppes of Kazakhstan called Centaurs.

The lessons we learn from the old legends of the Centaurs, apart from the inadvisability of raping the wife of one's host, is that the human mind always tries to construct something familiar from the unfamiliar. It does seem quite feasible that the astonishing sight of a rider on a horse, to someone who had never before seen a horse, would be a mental construction of a hybrid animal - a most unnerving result! When we see patients with an acutely swollen and painful calf, our consciousness usually constructs an image of our most familiar experience in this situation - that of a DVT. But the lessons of the stories of the Centaur tell us that often things are not what they first seem! The commonest alternative explanation for this "classical" presentation is the rupture of a Baker's Cyst. To those who have never before seen this far less common condition - a DVT would be a perfectly feasible explanation!

BAKER'S CYST

Introduction

A **Baker's cyst** (or popliteal cyst) is a pathological fluid-filled out pouching of the normal synovial lined cavity of the knee joint.

The condition is benign and relatively common.

Patients usually present with progressive pain and swelling behind the knee, but on occasions an acute rupture of the cyst can **mimic a DVT**.

Treatment is usually conservative. Occasionally needle aspiration of the cyst is required to alleviate symptoms. Steroid injections are also sometimes used. Rarely surgical removal may be warranted.

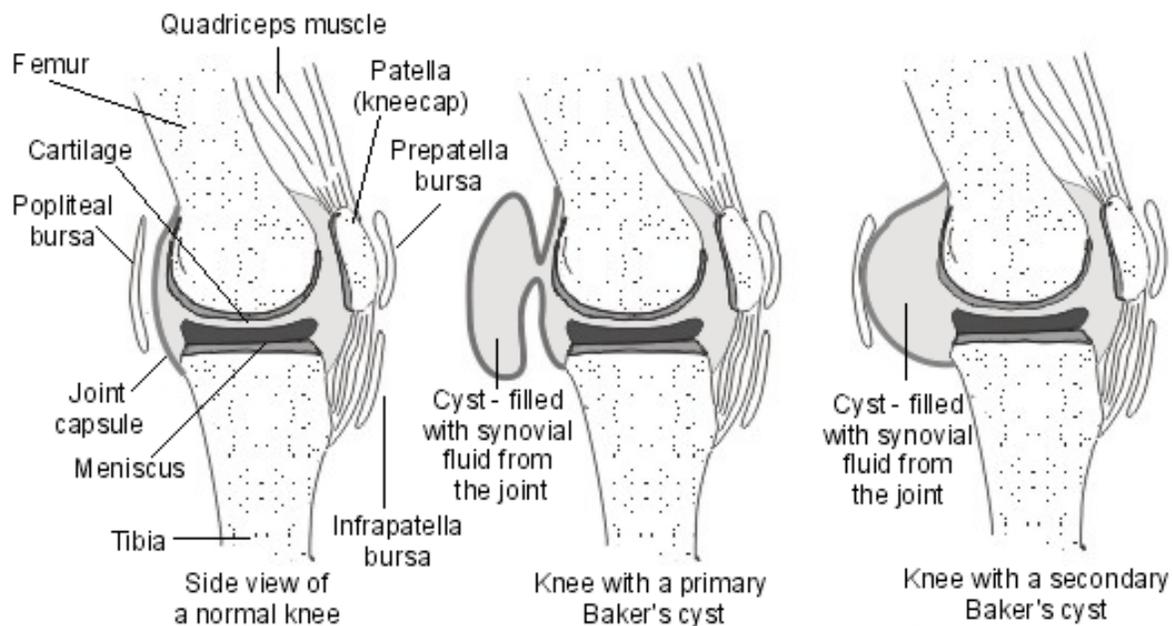
History

Baker's cyst was named after the English surgeon, **William Morrant Baker** (1839-1896) who first described this entity in 1885.¹

Epidemiology

Primary cysts may occasionally be seen in children aged 4 to 7 years however, Secondary Baker's cysts are seen much more common in adults aged 35 to 70 years.

Pathology



Primary and Secondary Baker's Cysts of the knee, (Source: www.patient.co.uk/)

Causes include:

1. Primary or Idiopathic, (uncommon):

A Baker's cyst may develop just behind an otherwise healthy knee joint. This type of cyst is sometimes referred to as a primary or idiopathic Baker's cyst.

It usually develops in younger people and children.

In this type of Baker's cyst there is a narrow connection between the knee joint and the popliteal bursa behind the knee.

This means that synovial fluid from inside the joint can pass into the *popliteal bursa* and a Baker's cyst results.

2. Secondary, (common):

Baker's cysts may also form secondarily to pre-existing pathology or trauma to the knee.

In a secondary Baker's cyst, the underlying problem within the knee joint causes too much synovial fluid to be produced within the joint. As a result of this, the pressure inside the knee increases.

This has the effect of stretching the joint capsule. The joint capsule eventually bulges out into the back of the knee, (*usually between the medial head of the gastrocnemius and semimembranosus muscles*) forming the Baker's cyst that is filled with synovial fluid.

Secondary causes include:

- Degenerative:
 - ♥ Most commonly in association with osteoarthritis.
- Inflammatory:
 - ♥ Most commonly in association with Rheumatoid arthritis
 - ♥ Less commonly it may be seen in association with Psoriatic arthritis or with Gout.
- Post traumatic:
 - ♥ Usually in relation to meniscal injuries.

Complications

Baker's cysts are predominantly benign, but do have some complications, including:

1. Rupture:
 - About 1 or 2 in 20 Baker's cysts are thought to eventually rupture.
2. Larger lesion may predispose the development of a DVT.
3. Very rarely, the cyst may become infected.

Clinical features

Patients will most commonly present with:

1. Increasing pain behind the knee
3. Swelling behind the knee
4. Acute pain behind the knee and the in the calf:
 - This will usually be due to a rupture of the cyst, with consequent tracking of synovial fluid downward between muscle planes.
 - Pain and swelling then extends from the popliteal fossa into the lower calf.
 - Clinically this can appear very similar to a DVT, and the condition is only discovered on ultrasound, being done to exclude a diagnosis of DVT.

Many smaller cysts however are completely **asymptomatic**, and are found simply on clinical examination or on imaging studies done for other reasons.

Investigations

Plain radiography

Calcifications can occur within Baker's cysts, and these can be seen on plain radiography, although a Baker's cyst itself cannot be definitely diagnosed on plain radiography.

Ultrasound

This is an excellent, and readily available imaging modality for the detection of a Baker's cyst.

CT Scan

CT scan can reliably detect a Baker's cyst, but expense and availability, in addition to radiation exposure mean that this is not the usually imaging modality used to diagnose the condition.

MRI

This is the best imaging modality for the diagnosis of Baker's cyst, but expense and availability usually preclude this as the preferred initial investigation.

MRI has the advantage of giving excellent information about the rest of the knee joint, and the possible cause of a Baker's cyst.

Management

Many cases of secondary Baker's cyst will settle spontaneously with time, although this may take a period of months to years.

For acute symptoms:

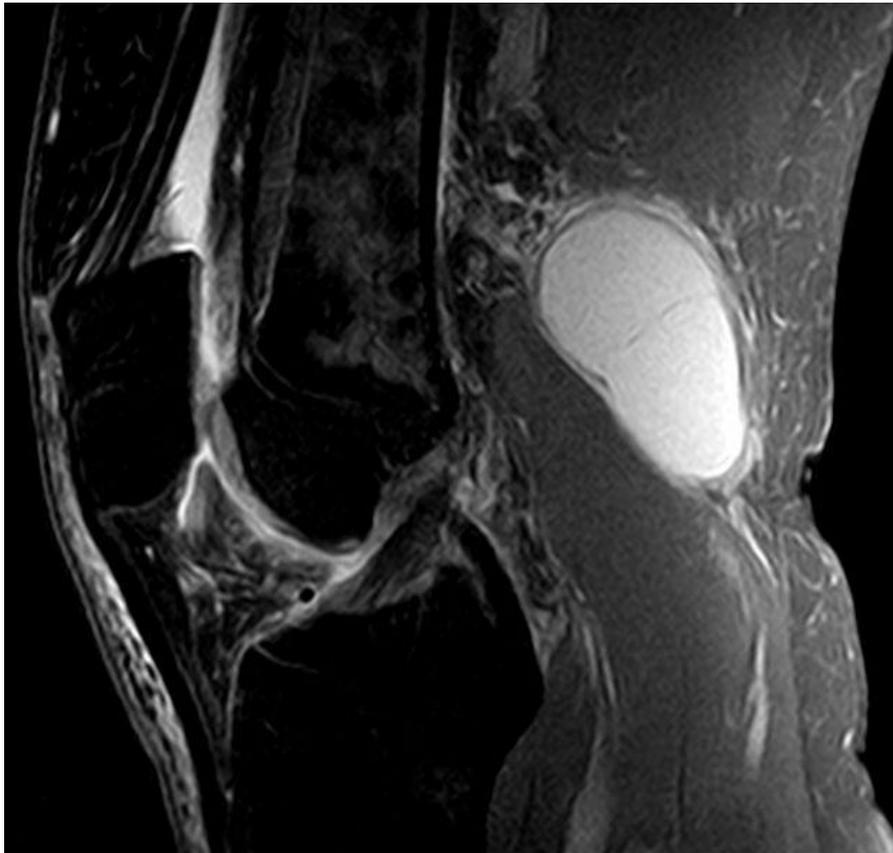
1. Rest
2. Crutches
3. Support stockings
 - These provide compression and may help to reduce the swelling as well as the risk of a DVT.
4. Anti-inflammatory agents:
 - NSAIDs
5. Attention should also be directed to any underlying cause, where possible.
6. Steroid injections:
 - Steroid injections into the cyst may help to relieve pain and inflammation, particularly in cases of Baker's cysts due to inflammatory arthritis, such as Rheumatoid arthritis.
 - These may provide some symptomatic relief, but will not resolve the condition.
7. Drainage:
 - Ultrasound guided needle aspiration can be used to drain larger painful Baker's cysts.

- This can give good immediate relief, however is not definitive treatment, and the cyst may expand again over time.

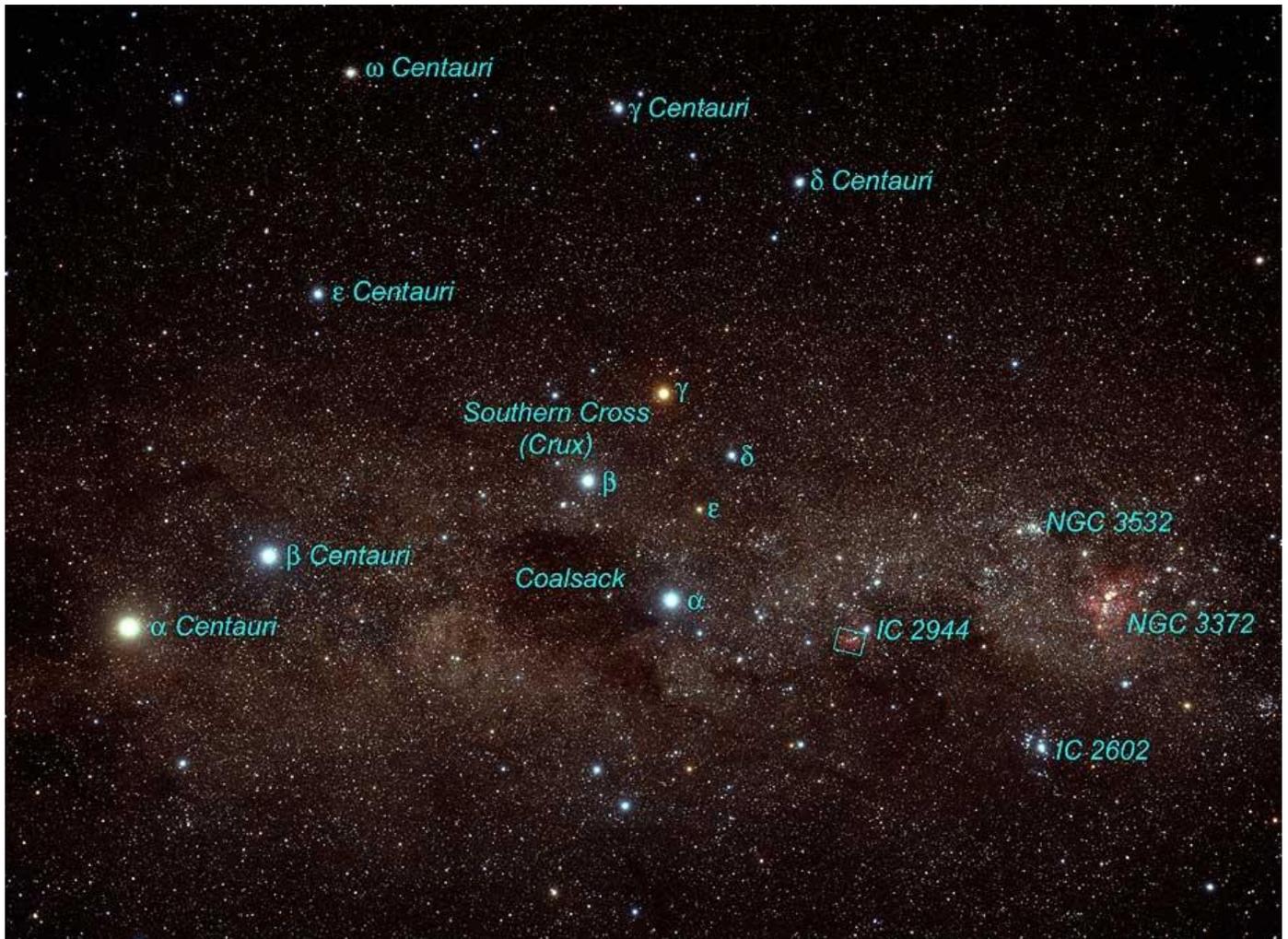
8. Surgery:

- Surgery this is sometimes undertaken, when a cyst is very large and/or very painful and/or other treatments have not worked.
- Sometimes a “keyhole” method is employed to close off the connection between the Baker’s cyst and the knee joint.
- It may also be removed using open surgery.
- Surgery may be carried out to treat an underlying problem at the same time - for example, the repair of a meniscal tear.

[Appendix 1](#)



MRI, image, sagittal section, showing a large Baker's cyst.



The magnificent constellation of Centaurus, the Centaur, surrounding the Great Southern Cross.

References

1. W. M. Baker: "The formation of abnormal synovial cysts in connection with the joints". II. St. Bartholomew's Hospital Reports, London, 1885, 21: 177-190.

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