Bone and Joint Diseases

Use of local steroid injections

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Synthetic corticosteroids exert a strong anti-inflammatory effect, both when administered systemically and when injected locally. The latter effect is enhanced by using microcrystalline suspensions that are taken up by phagocytic cells and can be shown to remain in situ far longer than soluble preparations that are rapidly dispersed. The microcrystals may themselves induce an acute inflammatory response (as in gout) either in the joint or soft tissues. Occasionally this may be intense and prolonged for several days.

Numerous preparations are available, but in practice it is useful to have available two or three preparations varying in strength and length of action. The long-acting agents tend to cause more intense and prolonged exacerbations, and are considerably more expensive. Suggested preparations are hydrocortisone acetate, strength 25 mg/cc for which the manufacturers claim a duration of about 10 days; methylprednisolone acetate, 40 mg/cc, 21 days; and triamcinolone hexacetonide, 20 mg/cc, 90 days.

Slow absorption occurs that may produce a systemic effect on other inflamed tissues, and if injections are given indiscriminately the effect can accumulate and produce hypercorticism.

For intra-articular injection there is little benefit in admixing local anaesthetic as it is desirable to keep the injected volume as low as possible, particularly in small joints. Soft-tissue lesions, however, may be difficult to locate with certainty. If a small quantity of dilute local anaesthetic is added to the injection and it produces rapid relief of pain this helps to indicate that the injection was correctly sited.

Intra-articular injections

Intra-articular injection is indicated in several conditions.

Inflammatory polyarthritis when the general disease is largely suppressed by systemic treatment but one or two joints remain persistently active.

Inflammatory monoarthritis when intra-articular steroid injection may be effective without using systemic drugs.

Trauma—The resolution of a haemarthrosis or persistent synovitis may be hastened.

Mild degenerative joint disease, particularly of the knees, may be complicated by acute synovitis, possibly the result of irritative debris. If the joint is stable and painful at rest one or two injections may produce rapid relief.

Crystal synovitis, either due to urate (gout) or calcium pyrophosphate (pseudogout) crystals, usually responds to rest and vigorous treatment with indomethacin, phenylbutazone, or

colchicine by mouth. Joint aspiration is usually needed and often shows a purulent effusion that is sent for polarised light microscopy and culture to exclude sepsis. If the attack is severe or prolonged steroid injected into the joint helps to speed relief.

If in any of these conditions the initial effect is poor, repetitive injections are not justified. This is particularly true if there is severe articular damage or instability of the joint. There is circumstantial evidence that repeated injections may cause aseptic necrosis, particularly of the femoral head.

Most of the synovial joints of the body may be injected. The most common joints in rheumatological practice are listed in table I. Space does not permit detailed description of the injection method of each joint, but these are well described by Cawley.¹ It must suffice here to comment about one or two specific sites (table I).

TABLE I—Intra-articular injections

Axial Temporomandibular Sternoclavicular Acromioclavicular Manubriosternal ? Costotransverse ? Vertebral apophyseal joints ? Sacroiliac joint	Arm Glenohumeral Elbow Wrist Small hand joints
	Leg Hip Knee Ankle Small foot joints

The manubriosternal joint may be the site of a persistent synovitis, the pain from which mimics angina. The small joint space is easily palpated and injected but a short needle must be used to avoid the possibility of perforating the ascending aorta that lies behind the joint.

Some books describe injection techniques for the costotransverse rib joints in spondylitis and for the vertebral apophyseal joints. While this may be done successfully with a reasonable frequency in cadavers, probably in vivo the injection will at best lodge in the neighbourhood and exert non-specific or even systemic effects.

Similarly, the synovial part of the sacroiliac joint lies 7-10 cm deep and comprises only one-third of the opposed bony surfaces. The chances of negotiating the narrow irregular gap between the sacrum and the ilium at this depth seems slender.

So long as reasonable sterile precautions are taken there is little risk of articular injections producing infection. Disposable syringes and needles and a fresh ampoule should be used, discarding any residue. For injecting the hip joint it is best to use a disposable No 19 spinal needle since the removable trochar avoids the risk of introducing a core of skin with the needle.

Fluid may be withdrawn for diagnostic purposes or if the effusion is painfully tense paracentesis is continued to produce comfort. It is unnecessary to attempt to empty large lax effusions, as this may cause pain, synovial bleeding, and cartilage damage. If a haemarthrosis can be aspirated within several hours of the injury, however, before the fluid is too viscous, as much blood as possible should be withdrawn to reduce morbidity.

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Soft-tissue injections

Soft-tissue injections may usually be given with the minimum of facilities. For successful results accurate locating is essential, which may be achieved by a thorough functional examination using applied anatomy.² If local anaesthetic is being used the patient should be asked about any previous reactions as in dental treatment. In most soft-tissue injuries degenerative change and trauma are contributory in differing proportions. The main action of steroid appears to be the suppression of the local inflammatory response that is excessive and self-perpetuating in an obscure way. Steroids do nothing to promote healing; indeed, they may well retard the proliferation of repair cells, such as fibroblasts. There is a risk that steroid injection into dense fibrous structures, such as tendons, could produce rupture. In the case of long head of biceps no harm is done, but rupture of Achilles tendon may be irreparable.

The benefits far outweigh the disadvantages provided common sense is used. When the more powerful long-acting agents are injected into superficial lesions they may produce dimpling owing to atrophy of the subdermal fat and some violaceous discoloration of the skin that may be persistent. Hypospray injection is less painful and as effective for superficial lesions, but it is probably too time-consuming unless patients can be treated in batches (table II).

TABLE II—Connective tissue injections

Axial		
Interspinous ligaments—Cervical		
—Thoracic		
—Lumbar		
—Coccyx		
Epidural space		
Intercostal muscles (cough strain)		
Costochondral junction (Tietze's syndrome)		
Rectus sheath		
Pubic symphysis		
Arm		Leg
Supra/Infraspinatus tendon		Gluteal bursa
Subacromial bursa		Psoas bursa
Epicondylitis—lateral (tennis)		Knee—lateral ligament
—medial (golfers)		patellar retinaculum
Bicipital aponeurosis		Tibial tendons
Tenosynovitis—de Quervain		Achilles—bursa
—trigger finger		—paratenon
Carpal tunnel		

AXIAL

Much of the pain after whiplash spinal injuries is caused by compensation neurosis and the tenderness is diffuse. Localised tenderness at any level may be referred from deep structures or indicate a local ligamentous tear. It is worth trying a superficial injection of steroid in persistent cases, having excluded vertebral instability, since there is no risk and some patients obtain genuine relief.

ONE HUNDRED YEARS AGO The interesting report of a case of "profound intoxication following anaesthesia by ether" in the *Journal of December 30th*, reminds me of, I believe, an unusual case, which occurred in my practice about eight years since, of temporary insanity following the inhalation of chloroform. A woman had undergone the operation of removal of a cancerous tumour under the full influence of chloroform. On recovering consciousness, she manifested an intense aversion to myself, who had operated, so that it was absolutely necessary for me to leave the application of sutures, bandage, etc., to the surgeons who had assisted me. Meanwhile she was constantly muttering to them her desire that they should "kill" me. This condition had entirely passed off by the time of my next visit on the following day, and she had no recollection of the circumstance. She had previously expressed her determination that no one but myself should perform the operation; so there was no dislike of me.

In the other case, the operation is stated to have been tedious, and

Persistent back pain and sciatica from a prolapsed lumbar disc protrusion may be partly due to inflammatory changes in the dural sac or root sheath. A few controlled trials have suggested that the epidural injection of dilute local anaesthetic alone or combined with a long-acting steroid may give some lasting relief. As the occasional patient may collapse when injected with local anaesthetic, full facilities for resuscitation should be available—at least for the first time.

ARM

Subacromial bursitis³ may give rise to persistent rest pain for years, which can often be relieved by subacromial injection. Occasionally the pain is acute and agonising if a calcific deposit is being reabsorbed. Again steroid injection may give considerable relief. Tendon sheath lesions respond surprisingly well to injection of steroids, even when there is doubt that the needle accurately entered the sheath.

LEG

The gluteal bursa is not a single structure but is multiloculate, being interspersed between superimposed layers of muscle. Hence it is difficult to know where to place an injection.

While the pre-Achilles bursa responds well to steroid injection the tendon needs caution. There is no true tendon sheath but only a paratenon of loose connective tissue. Pain may indicate partial rupture, and local thickening may be caused by central degeneration of the tendon. On no account should the tendon be injected, as irreparable rupture may follow.

Comment

Much minor suffering may be alleviated by the judicious use of steroid injection. There are widespread complaints from patients and their general practitioners about getting appointments in orthopaedic and rheumatological outpatient departments. Much time could be saved if straightforward soft-tissue lesions could be injected in the surgery. Given a careful, accurate diagnosis the technique can easily be learnt by reading. Post-graduate courses are helpful but these tend to attract those who are interested enough to have learnt the basic techniques. These courses may be supplemented by specialists giving short lecture demonstrations in group practices.

References

- 1 Cawley, M I D, *British Journal of Hospital Medicine*, 1974, 11, 744.
- 2 Cyriax, J H, *Textbook of Orthopaedic Medicine*, 6th edn, vol 1. London, Bailliere Tindall, 1975.
- 3 Yates, D A H, *Medicine*, 2nd series, p 712. London, Medical Education Ltd, 1976.

the quantity inhaled necessarily large. Doubtless, as with alcohol, the first effect of ether is as a stimulant, and then larger doses act as a depressant, thus giving it a similarity of action to chloroform; and thus the question may be raised, how far ether is superior to chloroform in protracted operations. But the point to which I wish to call attention is the intoxicating effect of chloroform in my case. It may be more common than I am aware of, but I have never read of a similar case. I think it an excellent plan to administer a good dose of brandy and water before the inhalation of chloroform, thus giving a stimulus to the heart's action, and guarding it against the depressing effect of the anaesthesia. In a case of an old woman aged 87, whose finger I removed about three years since, it acted remarkably well, appearing to assist the anaesthetic action of the chloroform.

I hope this brief communication may elicit from other practitioners reports of any similar cases which have occurred in their practice, with practical observations and suggestions thereon. (*British Medical Journal*, 1877.)