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MRI SCANS

What is an MRI scan?

Magnetic Resonance Imaging (MRI) is a simple, painless examination that can produce images of the inside of your body without the use of radiation. The MRI "magnet" uses magnetic fields and radio waves – not X-rays – to "see" your internal organs and soft tissue. Occasionally, an injection is necessary to provide further information about certain organs.

Costs and licensing

This is a confusing area brought about by the Federal Government only licensing a limited number of scanners in Australia. The fee for attending a Licensed scanner is usually around \$600 for a low back or neck scan, while the non licensed scanner fee is around \$260. There is no Medicare rebate for attendance at a non licensed centre and none is claimable through Private Insurance. To obtain the \$400 rebate from a licensed centre you must have a referral from a doctor who is recognized as a specialist by the Health Insurance Commission (HIC). At this clinic only Dr Daniel Lewis and Mr Michael Johnson are recognized as specialists. Thus if you have a referral from Drs Wilk, Brzozek or Wan, you will not be eligible for a rebate and you need to attend a non-licensed centre including: Victoria House Radiology, Box Hill MRI, Frankston MRI and Western Private Hospital. Sometimes the Licensed centres will perform the MRI for the lower unlicensed fee – but you should check beforehand. Licensed centres include Cabrini Hospital, The Avenue, Mercy Private Radiology and John Falkner Private Hospital

How does MRI work?

MRI combines the power of a computer with the safety of magnetic and radio waves to create extremely detailed and specific internal images of your body. MRI scanning allows the differentiation of different types of tissue, including air, water, fat and bone. However, MRI cannot show pain.

MRI can detect disc degeneration by a decrease in the signal intensity on some MRI sequences (T2 weighted). The nucleus of a normal intervertebral disc has a high water content and shows up as white on these images. In disc degeneration the centre of the disc dries out and appears darker. As the water content decreases, the centre of the disc will look more black on these MRI images.

The disc undergoes degenerative changes throughout life, and the process of degeneration itself does not appear to be painful. Some of these changes reflect normal ageing, and other changes may be related to increased mechanical stress or trauma. Using MRI, about 5 per cent of lumbar discs in people under 20 show signs of degeneration. The incidence of disc degeneration increases with ageing so that by age 40, 50% of people have at least one degenerate lumbar disc and by age 70 most discs are degenerate. Not only does disc degeneration increase with age, but the proportion of severely degenerated but painless discs increases with age.

The problem with the finding of disc degeneration on MRI is that there is little correlation between disc degeneration and symptoms. Therefore, there is little use in having an MRI, as it may or may not show degeneration, but it may not reveal the cause of back pain, or referred leg pain down the leg.

However MRI does have some specific roles to play in the diagnosis of back problems as follows:

Diagnosis of disc prolapse

A disc prolapse is where the disc has ruptured or torn and is now pressing on a nerve causing shooting electric type pains into the arms or legs. If the nerves are being squashed or pinched, numbness and weakness will also be present. The precise level may be diagnosed by the doctor examining the reflexes and other neurological signs and this may be confirmed on MRI scanning.

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High intensity zones (HIZ)

A high intensity zone is a bright spot seen within the posterior part of the disc annulus, which may be indicative of a tear of the annulus or outer rim of the disc. Like disc degeneration, HIZs are also seen in about one third of the normal population and thus may not be diagnostic of pain.

End Plate Changes (Modic changes)

When discs degenerate sometimes there is inflammation that affects the bone above and below the disc and this may show up on the MRI scan as oedema – fluid build up or fatty change in the bone. Recent studies suggest that these changes are more likely to cause symptoms than any other findings.

Prior to operation

In considering operations to either remove a disc prolapse or fuse together the joints of the spine MRI is useful for the surgeon to help plan the operation. Because the discs above the fused joints need to be very healthy, an MRI can help in the determination of the state of health of these discs. If the MRI shows the discs above or below the intended fusion to be degenerate, then there is increased risk that the extra strain on those discs after fusion may cause problems in years to come.

Does a normal MRI mean that there is no physical cause of pain?

Not necessarily. An MRI scan may appear normal even when there is a painful focus in the spine. MRI cannot diagnose muscle or ligament pain. Other studies have shown that about 15% of discs that appear to be normal on MRI are later shown to be the cause of pain. Sometimes the joints or discs may develop changes over time, and in other cases the MRI may not change.

Discography

Discography involves placing a needle into the disc, followed by the injection of dye into the centre of the disc (the nucleus). The pressure of the fluid going in leads to stretching the outer rim of the disc (the annulus) which may be painful. X-rays are then taken to outline the extent of any tears of the annulus. If the injection of material into the centre of the disc reproduces the pain, then that is suggestive that the disc is causing pain. These injections are typically very painful – even if the disc is not causing the present problem.

Until only recently discography was thought to be the most reliable way of diagnosing disc pain – but recent studies have cast major doubt on its usefulness, as many discs may be sensitive to a needle inserted into them, but may not cause pain at other times. Other studies have shown that if people have more than one area of pain in the body they are much more likely to have a positive discogram. Dr Caragee recently published a trial showing only 27% success rate in lumbar spine fusion surgery for discogenic pain diagnosed by discography.

Further detail about these studies can be obtained on the internet by looking up – Reliability of Discography and Dr Eugene Carragee from the United States.

References:

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