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MEDIAN NEURECTOMY.

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THIS operation, which has not yet become generally adopted in England, has been practised for some time by veterinary surgeons in Germany, France, and Belgium. According to M. Pellerin, a Paris veterinary surgeon, who has written a small pamphlet on the subject, Median Neurectomy was first practised by Peters of the Berlin School several years ago, he himself (M. Pellerin) having been the first to introduce it into France in 1892.

The operation consists in the excision of a portion of the median nerve high up on the inside of the elbow-joint, just below the internal condyle of the humerus; in this latter situation the nerve runs behind the artery, then crosses it, and descends in a slightly forward direction behind the ridge formed by the radius, to pass deeply down between this bone and the flexor metacarpi internus. Before operating the animal should be cast and chloroformed, the usual antiseptic precautions being observed; a cross-hobble is then applied, and the leg, released from the other hobbles, is pulled downwards with a rope in order to expose the surface to be operated upon, and render it as tense as possible. A bold incision is then made through the skin and aponeurotic portion of the pectoralis transversus and panniculus muscles, about 1 to 3 inches (depending on the size of the horse) below the internal condyle of the humerus, and immediately behind the ridge formed by the radius; this latter, and the nerve which can be felt when passing over the elbow-joint, form the chief landmarks. The hæmorrhage which ensues is principally venous, and is easily checked by artery forceps. In some cases I have found it of advantage to put

on a tourniquet below the seat of operation, but this is not always advisable, as it distends the radial artery. We now have exposed to view the glistening white fascia of the arm, which must be incised cautiously for about an inch; this will reveal the median nerve itself, situated upon the red fibres of the flexor metacarpi internus muscle. If not fortunate enough to have cut immediately over the nerve, it can be readily felt with the finger between the belly of the flexor muscle and the radius. The next step is to raise the nerve by passing a tenaculum behind the muscle, taking care to avoid injuring the artery or vein, and excise as much as possible. After this the wound is sutured and treated with antiseptics, etc., until it has healed, plenty of cold water being applied, and a fair amount of exercise allowed.

The following is a list of cases upon which the operation has been performed:—

CASE 1 was an aged pony, suffering from an overshot fetlock, on the off fore leg, due to severely contracted tendon; it was very lame, in fact could scarcely bear any weight upon the limb when walking, and trotted with the greatest difficulty; various remedies were tried for two months, but all without any temporary or permanent benefit.

On 5th October 1895, median neurectomy was performed under chloroform; the result was wonderful; when sufficiently recovered from the chloroform the animal both walked and trotted without manifesting the least lameness. The wound was treated antiseptically until it healed; on the 12th of October the pony walked stiff and sore from the wound, but after trotting for some distance this worked off, and the lameness was scarcely perceptible. However, as the fetlock became more overshot, and the animal gradually became as lame as before the operation, it was destroyed on the 6th November. Careful dissection of the limb (for which I am indebted to Mr Sykes of Class B) revealed the skin to be firmly adherent to the subcutaneous tissues at the point of operation, the portion of the media nerve above the wound to be of normal size, whilst that below was somewhat atrophied, though not to such an extent as to interfere with its dissection. The primary cause of the trouble was found to be a small ulceration of the articular surface on the internal side of the lower end of the large metacarpal bone; there was also an exostosis on the antero-internal aspect of the joint.

Remarks.—This animal was operated upon under the impression that the enormously thickened tendon was causing lameness by pressing upon the plantar nerves during the act of locomotion; it certainly gave temporary relief, and, had not the ulcerated spot been present, might have sent the animal back to walking work. Of course the proper shape would not have been restored to the legs, nor would lameness have been removed if due to mechanical interference.

CASE 2.—Cab mare, very lame, suffering from indurated wind galls, with exostoses on the fetlock and down the inside of the metacarpas. She had been fired three months before, and various remedies tried without success, being still very lame. Median neurectomy was performed under chloroform on the 16th October 1895. After the operation there was a decided improvement, although there was still slight lameness. This latter may perhaps be accounted for by the fact of my having made a much larger wound than I ought to have done, and

also having pricked the vein. The mare was sent home, antiseptics and plenty of cold water applied, and exercise allowed freely.

25th October. Slightly stiff, otherwise lameness scarcely perceptible.

11th November. Wound quite healed; animal sent to work. I have seen the mare since, and received word from the owner a few days ago; she is working regularly, and has been doing so ever since; there is no apparent difference either in action or any other way between this leg and the other.

CASE 3.—Cab mare, aged, very lame, suffering from exostoses at the back of the fetlock and down the inside of the metacarpal bone. Median neurectomy was performed under chloroform 29th October 1895; owing to the fact that it was almost dead at the completion of the operation, the animal was not trotted. The wound granulated rather too freely, and had to be cauterised several times, finally healing up at the end of November. The mare was sent to work early in December, and has been regularly working ever since.

CASE 4.—Was a high-stepping pony, six years old, very lame from a large splint and a chain of smaller exostoses on the inside of the metacarpal bones. Actual cautery and subsequent blistering had been applied without success or any amelioration in the lameness. Median neurectomy was performed under chloroform 16th November 1895. When trotted after the operation there was not the slightest lameness perceptible; the wound progressed favourably, and the animal was sent to work 16th December. I saw the pony again this year on the 12th of August, and could detect no difference whatever between the action of the two legs. The animal has been in regular work ever since the operation, and has not shown the slightest sign of lameness. The smaller splints had disappeared, and the larger one was certainly only about one-half its former size. This process of absorption, however, is well known to sometimes occur in the case of splints, and without further statistics can hardly be put down to the operation.

CASE 5.—Pony, eight or nine years old, very lame on the near fore leg, suffering from an exostosis on the antero-internal region of the fetlock joint. The joint could be flexed well, so that the lameness did not appear to be due to mechanical interference.

Median neurectomy was performed under chloroform 17th January 1896. It was too dark when the pony recovered from the chloroform to notice the gait.

7th February. The wound was healing well, there being no lameness whatever; on the 11th the animal was discharged as cured, with instructions to go to work in about ten days. Unfortunately, a few days after this the pony met with an accident, from the result of which it became a cripple and was destroyed.

CASE 6.—Cab gelding, very lame on the near fore leg, suffering from exostoses on the antero-internal region of the fetlock. It had been in the present owner's possession four months, and had been lame about a month.

Median neurectomy was practised under chloroform 27th January 1896; after the animal had recovered from the chloroform it was too dark to see the immediate effect. This horse was put to work eleven days later, and worked regularly until April, when an attack of colic terminated its existence.

CASE 7.—Chestnut pony gelding, fifteen or sixteen years old, very lame in the near fore leg, suffering from a large exostosis immediately under the carpal bones on the internal aspect of the joint. The limb could be flexed fairly well. Thinking that lameness was possibly due to pressure of this exostosis on the upper portion of the internal plantar or other structures supplied by the median nerve, median neurectomy was performed under chloroform. As there was no improvement immediately after the operation, nor after the lapse of a month, the owner sold the animal, and I was unable to trace it further.

Remarks.—The diagnosis may have been incorrect, but possibly also there was some hidden affection in the carpal joint connected with the exostosis.

CASE 8.—Cab mare, about nine years old; been very lame for eight weeks, suffering from a large exostosis immediately under the postero-internal aspect of knee, which did not appear to interfere with flexion at all. This had been fired by pyro-puncture five weeks previously and afterwards blistered, no improvement resulting.

Median neurectomy was performed under chloroform on the 3rd of February. When trotted immediately after the operation the mare was decidedly less lame; by the 20th the lameness had almost entirely disappeared, and the animal was sent to work the following week.

I saw this patient a few weeks ago; she had been working regularly ever since, and showed no sign of lameness; the owner had noticed no point of difference between this leg and the other, and the action was not in any way altered; the exostosis appeared to be just about the same size as before the operation.

CASE 9.—Cab mare, aged, had been very lame for the past three months; had been in present owner's possession for eighteen months. The animal was suffering from exostoses on the inside of the fetlock and knee, and also had contracted and thickened tendons as the result of an old sprain. Actual cautery had been applied eight weeks before with no beneficial result.

Median neurectomy was performed under chloroform on the 5th of February. After the operation there was a decided improvement, and on the 17th the lameness was scarcely perceptible, whilst on 2nd March there was none at all. This animal was set to work a week after this latter date, and has been in regular work ever since. I saw her a few weeks ago and could detect no lameness or any difference between the action of the two legs.

CASE 10.—Cab gelding, seven years old, very lame, suffering from old-standing sprain and thickening of the flexor tendons, ringbone, and large splint. Had been fired on each place at some time or other; had been in present owner's possession six weeks, been lame three weeks.

11th February 1896.—Median neurectomy under chloroform; after the operation there was a very slight improvement.

2nd March. Only slightly lame; wound going on well. This animal was sent to work a few weeks later, and worked with occasional fits of lameness for about ten weeks, when the owner turned it out to grass; eventually it was sold, and I have been unable to trace it further.

CASE 11.—Cab gelding, nine or ten years old, very lame, suffering

from old-standing sprained tendon and ringbone. Had been fired and blistered five weeks before with slightly beneficial effect.

Median neurectomy under chloroform was performed 29th February 1896. After the operation the animal was certainly improved, though still slightly lame; this all disappeared at the beginning of April, and the horse was sent to work. I saw the patient a few weeks ago at work; the owner said that it had worked regularly ever since, except for a week's rest with slight sprain which was treated successively with cold applications.

CASE 12.—Cart mare, six years old, excessively lame, suffering from a splint as big as a tangerine orange and from ringbone. Had been lame for twelve months; was fired and blistered nine months ago, and turned out to pasture for eight weeks; worked well for a week, then fell lame again.

16th March 1896.—Median neurectomy was performed under chloroform. When trotted immediately after the operation the animal was still very lame, but in a few minutes this all passed off, and no lameness was perceptible. She was sent to work early in April, and in a communication I lately received from the owner I am informed that there has been no sign of lameness since, and she is in regular work.

CASE 13.—Van gelding, aged, excessively lame from the presence of a large splint; had been so about a fortnight.

18th March 1896. Median neurectomy under chloroform; immediately after the operation the animal trotted lame, but in a few moments this decreased and ultimately passed off altogether.

Sent to work early in April and is at present working regularly, the owner stating that there has been no lameness since.

CASE 14.—Van gelding, aged, been in the present owner's possession three or four years; had worked at intervals only for the past six or eight months; would work for a few days and then fall lame; was now lame both fore. Suffering from old-standing sprained and thickened tendons of both fore legs; had been fired twice, the last time being four weeks ago, with no improvement.

2nd April 1896. Median neurectomy of both fore legs under chloroform; no lameness could be detected after the operations; was sent to work the first week in May; has been working regularly ever since and shows no sign of lameness.

CASE 15.—Pony gelding, very old, had been in owner's possession six or seven years, had been very lame three months; suffering from old-standing sprained and thickened tendons, ringbone, and a very tender chain of splints.

2nd April 1896.—Median neurectomy under chloroform; immediately after operation lameness could scarcely be perceived; sent to work early in May; saw animal a few weeks ago, no sign of lameness, and owner said had been working regularly ever since.

CASE 16.—Cab mare, aged, suffering from a large splint on each fore leg, ringbones, and thickened tendons; had been fired some weeks before; was very lame on the near fore, and owner said was constantly lame on the off; had been lame at intervals for some months.

20th April. Median neurectomy was performed with the aid of cocaine by Mr Pierce, College Tutor; after the operation there was a

great improvement, although there was still perceptible lameness on the near fore. This eventually passed off, and the animal was sent to work on the 19th of May; has been at regular work ever since, with one interval of a few days' rest owing to the animal having hit her fetlock with the shoe of the other foot.

CASE 17.—Pony, aged, been in owner's possession six months, been very lame for six weeks; suffering from navicular disease.

21st April 1896. Median neurectomy with the aid of cocaine; no lameness after the operation. This animal was sent to work when the wound healed, but I have been unable to trace it further.

CASE 18.—Cab mare, aged, was lame when bought by present owner five days before; very lame, very tender and sore over region of a splint situated underneath the perforans tendons in the lower third of the bone.

25th April 1896. Median neurectomy under chloroform. Slight improvement after the operation, though still distinctly lame; still expressed pain when pressure was applied over the region of the splint.

On 18th May the animal was still lame, but the wound had not yet healed. Unfortunately, I have been unable to trace this case any further.

CASE 19.—Cab mare, aged, been in present owner's possession eight months; has been lame at intervals on the near fore leg ever since; suffering from ringbone, large exostoses on inside and outside of the fetlock, and another in front of the knee. Was now too lame for work.

27th April 1896. Median neurectomy under chloroform. After the operation could not detect the slightest lameness; was sent to work 27th or 28th May; has been at regular work ever since, and has not been lame again. I saw the mare a few weeks ago, and could not detect the slightest difference in action or in any other way between the two legs.

CASE 20.—Cart gelding, aged, been very lame near fore for three months, suffering from a splint about as large as a tangerine orange.

29th April 1896.—Median neurectomy under chloroform; after the operation there was a great improvement, although the lameness had not all disappeared. This case progressed favourably and was sent to work at the end of May; the animal has worked regularly since, and has not showed any sign of lameness.

CASE 21.—Cab gelding, aged; had been in present owner's possession about sixteen months; been too lame to work for the past five weeks. Very lame near fore leg; the cause was somewhat obscure; the animal had a small ringbone, and expressed pain when pressure was applied to the posterior part of the fetlock region.

29th April 1896. Median neurectomy under chloroform. The animal struggled a great deal when being cast, and after the operation was decidedly more lame than before. This increase of lameness persisted for about a week, and was probably due to some injury whilst struggling, but ultimately passed off. The patient was sent to work on the 17th of May, and is working regularly now.

CASE 22.—Cab gelding, aged, very lame both fore legs; owner said that animal had occasionally been lame during the past twelve months, and had been much too lame to work during the past four weeks.

The lameness was diagnosed as being due in each case to large splints which extended somewhat underneath the tendons, that on the near leg being about the size of a walnut, that on the off leg being about the size and shape of half a tangerine orange.

29th May 1896. Median neurectomy under chloroform was performed on both fore legs. After the operation the animal was still lame, though improved.

17th June.—The animal was discharged as being fit for work, the lameness having all disappeared, but the owner decided to turn it out to pasture. Up to the present time (August) there has been no return of the lameness.

CASE 23.—Cab mare, aged ; very lame near fore leg, has been in present owner's possession about seven weeks ; too lame to work for last six weeks.

4th June 1896. Median neurectomy under chloroform ; no lameness in that leg after the operation, but now the mare showed signs of lameness on the other one. Two days later the other leg was operated upon in the same way and with the same success. When seen last, at the end of June, the animal was quite fit for work, but I have been unable to trace the case further.

CASE 24.—Cab gelding, ten or twelve years old, suffering from ring-bone and old-standing sprained tendons. Would work about an hour and then fall lame.

15th June 1896. Median neurectomy under chloroform. Did not notice the case immediately after. Went on well, and was sent to work in July ; this animal is at present (September) working regularly, and has not been at all lame since.

CASE 25.—Pony gelding, aged, suffering from old-standing sprained tendon and large ringbones ; had been very lame for about eight weeks.

19th June 1896. Median neurectomy under chloroform ; after the operation the lameness was much decreased ; what there was left was probably mechanical and due to the shortened tendons. This case was unsuccessful, and the animal became very lame again and was eventually destroyed.

Remarks.—Perhaps this case might have improved if ulnar or external plantar neurectomy had been performed, but the owner did not wish it, and preferred to have his animal destroyed.

CASE 26.—Van mare, nine or ten years old, had been in present owner's possession six months, been lame one month. Was very lame, apparently from a large diffuse splint on the inside of the off fore leg.

22nd June.—Median neurectomy was performed by Mr Pierce, without any anæsthetic. After the operation the animal was still lame when trotting, though much improved. On the 3rd of July there was no lameness whatever, and on the 9th the animal was sent to work ; the mare has been working regularly ever since, and has given no further trouble.

CASE 27.—Cab mare, very lame, suffering from an exostosis on the inside of the knee bones ; has been lame for some months.

16th July 1896. Mr Pierce performed the operation, no anæsthetic being used. When trotted afterwards the lameness was much decreased.

30th July. Still lame when trotting, but wound not yet healed. I have not been able to trace this case any further.

CASE 28.—Cab mare, aged, very lame ; suffering from ringbone and navicular disease.

17th July 1896. Median neurectomy under chloroform ; did not see the animal trotted immediately after the operation.

7th August. As there was no sign of improvement, plantar neurectomy was performed on each side ; after this operation there was no lameness at all. This case is still under observation but promises to come to a successful termination.

CASE 29.—Cab gelding, fourteen or fifteen years old, very lame, suffering from an exostosis on the antero-internal aspect of the knee.

17th July 1896. Median neurectomy under chloroform ; walked decidedly better after the operation, though still trotted lame ; this all passed off ; the animal was sent to work the first week in August, and is now working regularly.

CASE 30.—Cab gelding, aged, suffering from very large splint and thickened tendons on both fore legs, very lame near fore, and owner says is often lame on off fore. Has been in present owner's possession four months ; been very lame for ten weeks. Has been severely fired before in present owner's hands ; has been blistered seven weeks ago and turned out to pasture with no improvement.

29th July. Median neurectomy under chloroform on both fore legs ; after the operation, when the animal had trotted for a few moments, there was no lameness perceptible. This case progressed favourably, was sent to light work during the last week in August, and is now working regularly.

CASE 31.—Cart gelding, seven years old, very lame off fore from an excessively large and awkwardly placed splint directly under the tendons. Had been lame six weeks ; was fired and blistered about a fortnight ago.

29th July. Median neurectomy under chloroform ; no visible improvement after the operation.

12th August. Still very lame ; applied a blister over the region of the splint ; wound healing well.

This case is still under treatment (September).

CASE 32.—Cab mare, eight or nine years old, very lame off fore, suffering from ringbone, exostosis on each side of the fetlock joint, atrophied frog, and concave sole. Had been in present owner's possession a month, and been too lame to work all the time ; had previously been fired.

10th August. Median neurectomy under chloroform ; after the operation the animal was decidedly improved, though still lame.

This case is still under treatment. I think that external plantar neurectomy will probably have to be performed.

CASE 33.—Trap gelding, ten or twelve years old, very lame near fore, suffering from ringbones, several chain splints, and exostosis on the inside and outside of the fetlock. Was fired from knee downwards five weeks ago, and turned out to pasture with no improvement.

13th August. Median neurectomy under chloroform ; after the operation there was a slight improvement, but the animal was still too lame to work.

28th August. Removed the external plantar as the animal was still very lame ; this made a decided improvement.

The case is still under treatment, but promises to end successfully.

CASE 34.—Cab gelding, aged, very lame on the near fore, suffering from large splint extending underneath the tendons and ringbones.

21st August. Median neurectomy under chloroform ; decidedly improved after the operation, though still slightly lame.

28th August. Going on well ; gives prospect of complete recovery. The case is still under treatment.

CASE 35.—Pony gelding, six years, excessively lame on the near fore ; had been so for three months ; in present owner's possession eight months ; suffering from a large diffuse splint under the knee and tendons of the near fore leg ; no other abnormality could be detected.

21st August. Median neurectomy under chloroform ; no improvement whatever after the operation.

This case is still under treatment.

CASE 36.—Cab mare, fourteen or fifteen years old, very lame on the near fore ; has been lame off and on for about nine months, and excessively lame during the past three weeks ; is suffering from ringbones and splint about as big as a walnut at the back and inside of the leg immediately under the tendons ; had been severely fired about twelve months ago.

26th August. Median neurectomy under chloroform ; after the operation the animal showed no lameness whatever.

This case is still under treatment.

Summarising the above, it will be seen that the results are very satisfactory. Out of the thirty-six cases seven are still under treatment, two were not at all improved, and twenty-four have been sent to work ; of the latter I know that eighteen are working regularly, two were sent to work but have died from other causes, one worked for ten weeks and was then sold, thus being lost sight of, and three were unable to be traced. Five animals were operated upon in both fore legs.

Of course, like all neurectomies, it is not an operation which is to be indiscriminately advised. The chief sequelæ to be feared are those of softening and ultimate rupture of the flexor tendons, and sloughing of the hoof ; but, according to those who have largely practised median neurectomy, the percentage is small ; there has scarcely passed sufficient time as yet to venture an opinion in the above cases. In regard to these accidents, we must not forget that there is still a certain amount of nerve supply to the whole of the outside of the limb from the branch of the ulnar nerve which joins the external plantar, and that the same branch supplies the outer side of the foot.

For old-standing lameness, where due to splints, exostoses anywhere on the inside of the leg, chronically sprained, thickened, and painful tendons, or cases of that kind which cause pain by pressing on the adjacent nerve structures, after all other treatment has failed, the operation is certainly to be recommended ; but for ringbones, side-bones, exostoses on the fetlock, navicular disease, or lameness caused by anything below the usual seat of plantar neurectomy, there is no advantage over this last operation ; in fact, there is the disadvantage

that one has unnecessarily deprived a large portion of the leg of its normal nerve supply.

It is worthy of notice that although in some cases there was immediate improvement when the animal was trotted after the operation, in others this was very slight but as the wound healed the lameness completely disappeared.

EQUINE TUBERCULOSIS.

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IT is perhaps not uninteresting to recall the fact that when, in the first volume of this Journal, eight years ago, I published a note regarding two cases of tuberculosis in the horse, an eminent veterinary teacher endeavoured to throw discredit on the observations, maintaining that the horse was immune against tuberculosis, and that the alleged cases were probably examples of glanders. Since that date it has become generally recognised that the horse possesses no immunity against tuberculosis, and that instances of the disease in that species are far from being rare.

In an article which appeared in Vol. V. of the Journal I published notes of other cases in which the nature of the disease was verified by the discovery of Koch's bacillus in the lesions, and since that date upwards of ten cases have annually come under my notice. In the greater number of these cases my acquaintance with them was limited to an examination of portions of spleen, lung, or other organ sent to me in order that I might confirm the diagnosis made by those in whose practice the cases had occurred. In a number of the cases, however, I had an opportunity to see the animal alive and to make a *post-mortem* examination, and a few of these I shall here describe.

CASE I.

The subject in this case was a black pony, aged, and about thirteen hands high, which was admitted to the College Infirmary in December 1893. The early history of the animal was not obtainable. It was generally unthrifty, and one of its submaxillary glands was enlarged to the size of a pullet's egg, and much indurated. In consequence of these symptoms the animal came under a suspicion of glanders, and it was tested with mallein. This was not followed by any reaction, but at that time our experience with mallein had not been wide enough to justify absolute confidence in it when its verdict seemed opposed to the symptoms. Indeed, I may say that both Professor Macqueen (under whose care the pony then was) and myself were so satisfied that the animal was glandered that we set this down as a case in which mallein had given a wrong verdict. The case was therefore notified to the Veterinary Inspector of the district, and the pony was slaughtered on the 1st of January 1894. But no sooner were the abdominal viscera exposed than it became quite obvious that if the case was one of glanders it was at the same time one of tuberculosis. The following are the notes of the *post-mortem* examination:—