

## HISTORY

## The Woolley and Roe case

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Albert Woolley and Cecil Roe were healthy, middle-aged men who became paraplegic after spinal anaesthesia for minor surgery at the Chesterfield Royal Hospital in 1947. The spinal anaesthetics were given by the same anaesthetist, Dr Malcolm Graham, using the same drug on the same day at the same hospital. The outcome for the patients and their families was devastating, as it was for the use of spinal anaesthesia in the UK. At the trial 6 yr later, and against the opinion of leading neurologists, the judge accepted Professor Macintosh's suggestion that phenol, in which the ampoules of local anaesthetic had been immersed, had contaminated the local anaesthetic through invisible cracks. In an interview 30 yr after the verdict, Dr Graham believed that the tragedy was caused by contamination of the spinal needles or syringes during the sterilization process. The subsequent explanation that, on the day in question, descaling liquid in the sterilizing pan had not been replaced by water, supported his belief and finally offered a credible explanation. We review the Woolley and Roe case, the status of spinal anaesthesia before and after 1947, and the relevant medico-legal judgments in claims for negligence in the early days of the National Health Service.

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Albert Woolley and Cecil Roe became paraplegic after spinal anaesthesia at the Chesterfield Royal Hospital on Monday, October 13, 1947. Woolley, aged 56 yr, underwent meniscectomy of the knee and Roe, aged 45 yr, had a radical repair of a hydrocoele. The outcome for both men and their families was devastating. It was also devastating for the use of spinal anaesthesia in the UK for the next 25 yr.<sup>1 2</sup> The spinal anaesthetics had been given by the same anaesthetist, Dr Malcolm Graham (1916–1997), on the same day at the same hospital using the same local anaesthetic and the same technique.<sup>3</sup>

We have personal interests in different aspects of the case. Before training in anaesthesia in the Sheffield region in 1967–9, Maltby was in general practice in Chesterfield where he knew Dr Graham. He visited Dr Graham at his home in 1983 and recorded their discussion of the Woolley and Roe case during which Graham revealed unpublished facts and his explanation.<sup>4</sup> Hutter re-examined the case in 1990 and concluded that the most likely cause of the patients' neurological damage was contamination of the

syringes and spinal needles by acid descaling solution<sup>5</sup> rather than phenol contamination of the local anaesthetic in the ampoules. Clayton studied legal aspects of the case and interviewed the appeal judge, Lord Denning, during research for his LLM dissertation.<sup>6</sup>

**History**

The first spinal anaesthetic for surgery in humans was given by Bier in Kiel, Germany, in 1898,<sup>7</sup> using 0.5% cocaine. He soon abandoned the technique because of the toxicity and unpleasant side effects of cocaine. Tropacocaine was introduced in 1895,<sup>8</sup> and stovaine and procaine in 1904.<sup>9</sup> All were less toxic but also less potent than cocaine. Most surgeons, after trying procaine, preferred stovaine or tropacocaine. But side effects and occasional fatalities caused spinal anaesthesia to lose popularity until 1923 when Labat published *Regional Anesthesia*<sup>10</sup> and advocated the use of procaine. He recorded transitory headache, abducens nerve palsy, retention of urine and anal incontinence, but no permanent neurological sequelae after its use.

Fifteen years later in 1936, Brock, Bell and Davison<sup>11</sup> in New York described seven patients who developed a variety of neurological complications after spinal anaesthesia. Two developed aseptic meningitis, one polioencephalitis, one lumbar radiculitis, two cauda equina syndrome and one transverse myelitis. As most patients who received spinal anaesthesia did not develop neurological complications, the authors did not accept a direct chemotoxic effect of the local anaesthetic. The progressive case of cauda equina neuritis led them to suggest that a chemotoxic agent might allow other factors, such as a virus, to operate on neural tissue.

In 1937, Macdonald Critchley, who was an expert witness at the Woolley and Roe trial in 1953, led a discussion on post-spinal neurological syndromes at the Royal Society of Medicine.<sup>12</sup> These included lesions of the cauda equina and conus medullaris with urinary incontinence or retention, and radiculomyelitis with flaccid paraplegia or lower limb weakness. No explanation for this could be offered. During the same meeting, Ferguson<sup>13</sup> reported 13 neurological sequelae of spinal anaesthesia in Manchester in an 18-month period from August 1933 to March 1935 when approximately 1000 heavy duracaine, 1000 stovaine and other spinal anaesthetics had been given. Eight of these patients also had symptoms suggestive of a cauda equina lesion, for which no plausible explanation could be found.

In 1945, Kennedy, Somberg and Goldberg<sup>14</sup> reported three cases of spinal arachnoiditis with paralysis after procaine, eucopaine with procaine, or metycaine spinal anaesthesia. Symptoms commenced 4 days, 21 days and 5 days after operation. Laminectomy in all three patients showed obstructive arachnoiditis. Lysis of the dense adhesions produced modest improvement in two patients. He believed that the evidence for a chemotoxic effect of the anaesthetic drug was ample, and that the technique and infection were rarely to blame. Five years later<sup>15</sup> he described 12 more cases in which symptoms had commenced days to weeks after spinal anaesthesia with a variety of drugs. Most progressed to paraplegia with loss of control of the bowel and bladder. He attributed the neurological damage to the chemotoxic effect of the anaesthetic drug and concluded with an unequivocal condemnation of the technique: 'So, spinal anaesthesia is accompanied by many definite and terrible dangers which are far too little appreciated by surgeons and anesthetists. Paralysis below the waist is too large a price for a patient to pay in order that the surgeon should have a fine relaxed field of operation.'

The true incidence of neurological complications was still unclear when Woolley and Roe received their spinal anaesthetics. Ferguson<sup>13</sup> was one of the few authors who could give the number of spinal anaesthetics from which their cases came. Neurologists mentioned the local anaesthetic drug as the probable cause in most cases, except those of meningitis. They did not discuss methods of sterilization of the ampoules, spinal needles or glass syringes, or the possibility of chemical contamination.

The safety record of spinal anaesthesia was good, considering the lack of routine i.v. fluid loading, re-use of non-autoclaved needles and the fact that surgeons gave their own spinals. According to Dickson Wright, spinals had been used for upper abdominal surgery, and even thoracoplasty, thyroidectomy and craniotomy, without disastrous consequences.<sup>8</sup>

## The Woolley and Roe case

Spinal anaesthesia remained popular throughout the 1940s because of the high quality operating conditions it provided. In the late 1940s and early 1950s, its popularity waned as that of general anaesthesia increased. This was because of the introduction of neuromuscular blocking agents,<sup>16 17</sup> training of more anaesthetists who had consultant status in the National Health Service and the widespread publicity associated with the Woolley and Roe trial in the High Court in London in 1953.<sup>3 5 18</sup> The adverse publicity and the uncertainty over the true cause of these tragedies retarded the use of spinal anaesthesia in the UK by 20–25 yr.<sup>1</sup> More than 30 yr after the trial, Macintosh clarified the perceived difference between death from general anaesthesia and paralysis from spinal anaesthesia. In the former, the coroner, on the information available to him, would give his opinion that the unfortunate patient could not stand up to the anaesthetic and would record a verdict of misadventure. In the latter, litigation was likely to follow and result in a large out of court settlement.<sup>17</sup>

## The explanation

Hutter re-examined the details of the case in 1990.<sup>5</sup> It is most probable that the fundamental cause of the paralyses was an acidic descaler which, by an oversight, had been allowed to remain in the sterilizing water boiler. The spinal needles and syringes were then boiled in acid which subsequently contaminated the spinal anaesthetic solution when it was withdrawn from the ampoule before injection. This explanation may also account for other earlier unexplained episodes of paralysis after spinal anaesthesia. It appears that the role of the acidic descaler has now been accepted by the anaesthetic community.<sup>1 19</sup>

## The evidence before the court

At the trial in 1953, the court accepted Professor Macintosh's evidence that paralysis had been caused by the phenolic sterilizing solution seeping through invisible cracks in the glass ampoules of cinchocaine (percaïne, nupercaïne).<sup>3</sup> The Court of Appeal upheld this decision in 1954,<sup>5</sup> holding that the anaesthetist could not have been expected to know about this hypothetical risk in 1947. Therefore, because there had been no negligence, Woolley and Roe received no compensation.<sup>3 5</sup>

McNair J said in his judgment: 'In 1947 the general run of competent anaesthetists would not appreciate this risk ...

I accordingly find that by the standard of knowledge to be imputed to competent anaesthetists in 1947, Dr Graham was not negligent in failing to appreciate this risk.<sup>20</sup> It is clear that this statement has formed the basis of the later Bolam ruling by the same judge<sup>21</sup> that: 'The test is the standard of the ordinary skilled man exercising and professing to have that special skill. A man need not possess the highest expert skill at the risk of being found negligent. It is a well established law that it is sufficient if he exercises the ordinary competent skill of an ordinary competent man exercising that particular art.'

An editorial in the *British Journal of Anaesthesia* at that time<sup>22</sup> considered this sequence of events to be unlikely and thought it more probable that there had been contamination of the spinal cinchocaine with a different chemical irritant. Graham later identified the sterilizing process as the most likely source of contamination. The theatre sister responsible for this had been ill with violent headaches and vomiting on that day, and went off duty at lunchtime. She subsequently underwent successful removal of a pituitary tumour. He considered it plausible that she had failed to supervise the preparation of the needles and syringes.<sup>23 24</sup>

Graham did not believe the 'invisible crack theory' or the role of phenol. In 1983, he recalled that when ampoules were produced in court for his inspection he could eventually find the cracks but commented, 'These are thermal cracks, are they not?' He knew that cracks had been made in Oxford by touching ampoules with a hot wire. He and his colleague in Chesterfield had done 'all sorts of experiments banging them about and we couldn't crack one. We could smash them, but we couldn't crack them... They either broke altogether or nothing happened—unless you put a hot wire on them'.<sup>23 24</sup>

Further to this, and unknown to the court, Graham was aware that a third patient, who was very ill from intestinal obstruction and died a few days later, had probably also suffered neurological sequelae after a spinal anaesthetic on the same day as Woolley and Roe.<sup>5 23 24</sup> This could only have added support to Graham's belief that if three things happen in one day, there's a common cause; something went wrong, probably with the sterilizing procedure, that involved all three spinal anaesthetics on that one day.<sup>24</sup> The court never heard these views of Graham, and ignored the evidence of the neurologists<sup>5 23</sup> that phenol could not have caused these paralyses. Consideration of animal experiments in the physiological laboratory at Oxford to determine the effect of various concentrations of phenol on the spinal cord had been left too late. A letter from Bryce Smith to the plaintiffs' solicitors dated October 8, 1953,<sup>25</sup> 5 weeks before the trial, explained that these could not start for 2–3 weeks and that no definite report could be given for approximately 6 months. In his judgment,<sup>20</sup> McNair J also considered the significance of the severe headache suffered by Roe during and after the spinal injection. He argued that premedication of omnopon gr. 1/3 (20 mg) and scopolamine gr. 1/150 (0.4 mg) would have made Roe's recollection of

events during surgery uncertain, and that headaches were not uncommonly associated with spinal anaesthetics. He thus dismissed Roe's intraoperative headache as being of no relevance to the case and appears to have leaned over backwards to discredit Roe's evidence. He ignored the fact that, although post-spinal headaches occur after operation, Roe's had occurred immediately after injection of the local anaesthetic. The *British Journal of Anaesthesia* editorial<sup>22</sup> considered that this headache was not consistent with the phenol theory. On the contrary, it was good evidence for contamination of the spinal anaesthetic with a different chemical irritant. Cope's account of the trial<sup>3</sup> shows that Macintosh contradicted himself on whether there had been earlier episodes of neurological sequelae after spinal anaesthesia similar to the symptoms suffered by Woolley and Roe in which phenol would not have been present. If the court had pursued this point, the phenol theory would have been much more difficult to sustain.

Was acid contamination of syringes and needles foreseeable? Evidence was given at the trial that they were boiled for 20 min and, allegedly, washed in sterile distilled water.<sup>3</sup> This was the delegated responsibility of the theatre sister and her staff. It seems unlikely that Graham was aware that the theatre sister descaled the sterilizer with a strongly acid solution. At the trial it was stated that the solution in which the ampoules were soaked was coloured blue for 1/20 phenol and pink for 1/40 phenol.<sup>3</sup> Graham's statement that the colouring was to identify the solution as phenol<sup>4</sup> and not to detect contamination of the local anaesthetic is confirmed in Macintosh's letter of August 21, 1953 to the plaintiffs' solicitors that the stock solution of phenol from the hospital dispensary was coloured a faint pink to distinguish it from water and other substances in the dispensary.<sup>25</sup> If Graham had been aware of the sister's descaling procedure, it is possible that he would have ordered dye to be added to the descaling liquid to ensure that it was discarded and replaced with colourless water before instruments were placed in the pan to be sterilized.

Vandam and Dripps later reported a prospective study of 10 098 patients who received spinal anaesthetics and were followed-up for 6 months.<sup>26 27</sup> Sixty-six patients developed numbness or tingling in the lower limbs or feet that usually disappeared within 1 yr. Only one patient, who had an unsuspected spinal cord meningioma, developed incapacitating neurological disease. Greene acknowledged this safety record in 1961 in a comprehensive review of neurological complications.<sup>28</sup> He described cases of chronic adhesive arachnoiditis with clinical symptoms similar to those of Woolley and Roe as the most frequently encountered lesion but was unable to ascribe a specific cause. He attributed the overall decrease in neurological sequelae to the lack of histotoxic properties of procaine and amethocaine (tetracaine, pontocaine), strict aseptic technique and avoidance of detergents, germicides and chemicals during cleaning of spinal sets which, including ampoules, must be autoclaved.

## McNair J and Lord Denning: their contributions to the development of medical law

Lord Denning was sitting in the Court of Appeal in 1951 when the case of a plaintiff, whose hand had been left useless after elective surgery, came to appeal in *Cassidy v Ministry of Health*.<sup>29</sup> This presented an opportunity for final clarification of hospital liability. The trial judge had found in favour of the hospital because the plaintiff had not proved negligence against any of the hospital staff. However, the Court of Appeal overturned the verdict, applying the doctrine of *res ipsa loquitur* because the hospital had failed to rebut the negligence claim. Denning made the point that, when a hospital accepts a patient for treatment, it provides that treatment through the staff that it employs. If the staff are negligent in giving the treatment, the hospital is just as liable as anyone else who employs others to perform duties on their behalf.

The National Health Service had come into being in 1948. This opened the door to a radical change in judicial policy towards the rights of patients and Denning's judgment pointed the way. The Cassidy case in 1951 was a turning point in the evolution of the theoretical basis of the master and servant relationship at common law. Denning pointed out that the cause of the fallacy in the reasoning of the Hillyer case in 1909<sup>30</sup> was the anxiety to protect voluntary hospitals from economic disaster if they were held responsible for the errors of their staff. After the verdict, the *British Medical Journal*<sup>31</sup> took Denning to task because it thought the fallacy was being corrected at the expense of a local authority.

In 1952, Professor Aird<sup>32</sup> highlighted the unilateral character of medico-legal battles. Consultants were hesitant to offer expert evidence for a plaintiff, however deserving, or for a hospital governing body, however harassed. When Macintosh had misgivings about going into the witness box in the Woolley and Roe case, Roe's solicitors wrote him a letter dated January 14, 1953, that stated, in part: 'May I remind you how I put my troubles before you when we first met at luncheon with Dr Geikie Cobb? I gave you the history of the attempts made by the plaintiff's solicitors in the north and later by me in London, to enlist the assistance of an anaesthetist of standing... I told you how one after another the consultant anaesthetists who were approached, after indicating sympathy with the plaintiffs and sometimes condemnation of the defendants, flatly refused to give evidence against a fellow practitioner. I think I gave you a copy of the memorandum I had then in desperation drafted for the medical journals and the GMC, contending that the interests of justice would be seriously compromised unless a responsible authority on this branch of medicine would consent to advise and give evidence for the plaintiffs. I believe that when you consult your files you will find clear evidence that it is your evidence that we have always relied on getting.'<sup>25</sup> Macintosh replied that his views had not changed and he agreed that evidence should be given

against an anaesthetist who has been obviously careless or negligent.<sup>25</sup>

Later, in 1953, Denning conveyed some of his worries that had been created by Cassidy in his book *The Changing Law*.<sup>33</sup> He wrote that, 'In the days before nationalisation, the law was very tender towards the charitable hospitals.... That decision [Cassidy] has had widespread repercussions. Before nationalisation a case against a hospital was a rare thing. Now it is a very common thing. I do not suppose there is more negligence than there was before. The difference is that there is now a recognised legal remedy against the nationalised service. Not every point has however been cleared up.' It appears that from this point it became Denning's holy grail to protect doctors who felt vulnerable to charges of negligence by his own judgment in Cassidy.

In a case heard in May 1953,<sup>34</sup> a patient's left arm had become paralysed after operation and he was awarded £4000 as damages. Denning demonstrated his changed attitude to the medical profession. The arm had been abducted at 80° during surgery for a blood transfusion. Six months before the incident, an article in the *Lancet*<sup>35</sup> had warned against this risk. The trial judge took the view that failure to keep abreast of the professional journals was negligence. However, in the Court of Appeal, Denning overturned the judgment on the grounds that, if negligence amounted to no more than this, it was not enough. He concluded that it would be putting too high a burden on the medical man to say that he must read every article in the medical press.<sup>36</sup>

In the Woolley and Roe case in 1954,<sup>37</sup> Denning restated that hospital authorities are responsible for the whole of their staff, not only for the nurses and doctors, but also for the anaesthetist and surgeon. The only exception was the case of surgeons or anaesthetists selected and employed by a private patient. Regarding negligence, he stated that each of these plaintiffs, Woolley and Roe, was entitled to say to the hospital: 'While I was in your hands something has been done to me which has wrecked my life. Please explain how it has come to pass.' The hospital had explained that there were invisible cracks in the ampoules. When the ampoules were immersed in phenol to sterilize them, phenol had contaminated the local anaesthetic. This resulted in paralysis of the patients.

Denning used Goodhart's 1926 article<sup>38</sup> to argue that the person who is guilty of causing injury or damage should only be held liable for what a reasonable man in his position would have avoided by due care. The idea was to introduce foreseeability in place of probability. Denning argued that the test of duty depended on what you should foresee. The next question was whether the neglect of duty was a 'cause' of the injury. The chain of causation was broken when an intervening action occurred that you could not reasonably be expected to foresee. Only when those two preliminary questions, duty and causation, were answered in favour of the plaintiff did the third question, remoteness of damage, come into play. Denning thought that, in the case of a crack

in an ampoule that was invisible to the naked eye, the only foreseeable consequence was loss of local anaesthetic, not paralysis of the patient. The hospital authorities were therefore not liable. He concluded, 'One final word. These two men have suffered such terrible consequences that there is a natural feeling that they should be compensated. We must insist on due care for the patient at every point, but we must not condemn as negligence that which is only misadventure.'

Variations of this last sentence appeared in several of Lord Denning's later judgments on medical negligence. A reluctance to find against doctors in negligence cases became a Denning characteristic. In his 1979 book, *The Discipline of Law*,<sup>39</sup> he revealed the reasoning behind his change from pro-patient in *Cassidy v Ministry of Health* (1951) to pro-doctor in *Woolley and Roe v Ministry of Health and Others* (1954) and subsequent cases. Denning wrote: 'As a result of that case [Cassidy], the medical profession became alarmed. It seemed to have opened the door to many groundless charges of negligence. This became known to us—from articles in journals and periodicals and so forth. The courts are, I find, always sensitive to criticism. So in the next case [Woolley and Roe], we sought to relieve the anxieties of the medical men.'

This statement has been analysed and reviewed. One writer hypothesized that, 'presumably 'so forth' refers to innumerable encounters between judges and the higher ranks of the medical profession in their clubs.'<sup>40</sup> Also, the Cassidy case had been heard in the last 2 months of the Attlee government and Roe during Churchill's. Was political pressure applied to protect the National Health Service from increasing negligence charges? When asked about these possibilities by one of the authors (K. C. C.), Lord Denning said that lawyers and medical men rarely met in their clubs and categorically denied any political interference. His own explanation was more simple. The only influence was that of McNair J, who heard the original case and found no negligence. As an afterthought, Denning pointed out that McNair's sister was a doctor.

Many doctors felt at the time that Woolley and Roe should have received compensation, but not at the expense of a colleague's reputation. In 1955, a year after the appeal, Denning wrote that there was no way of giving compensation as the law stood.<sup>41</sup> The law would have to adopt a new test, asking who should pay rather than whose fault it was, with hospital authorities carrying appropriate insurance. Perhaps he had in mind something similar to present day no blame insurance in New Zealand. Against this was the argument that any person, employer or doctor who is negligent should be reprimanded, but should not suffer reprimand if innocent. He believed that if you make compensation payable without proof of negligence, you remove the moral basis of law. McNair and Denning shaped medico-legal case law in the 1950s, leaving a legacy that was successfully built upon over subsequent decades.

## Biographical notes

John McNair, Justice [William] McNair's father, was a Lloyd's broker who had three children (William, Arthur and Dorothy). Arthur became a consultant in obstetrics and gynaecology, and vice president of the Royal College of Obstetricians and Gynaecologists. William (1892–1979) became a distinguished lawyer and received a knighthood in 1946 for services as legal advisor to the Ministry of War Transport during the Second World War. He sat on the Queen's Bench from 1950 to 1966. As well as hearing the Roe case in the High Court, he made the definitive judgment in the case of *Bolam v Friern Hospital Management Committee* (1957),<sup>21</sup> a landmark case. Dorothy trained as a doctor at the Royal Free Hospital and went into general practice at Dulwich, holding anaesthetic appointments at the South London and at Sydenham Children's Hospitals throughout the Second World War. With the introduction of the NHS, she devoted herself entirely to anaesthesia and was elected FFARCS in 1951. A former colleague, Dame Josephine Barnes, recalls Dorothy as a most competent anaesthetist with superb organizational ability, one of the subjects of the latter skill being her younger brother William! Neither William nor Dorothy married and they shared the family house in Dulwich. They mixed in the same circle of friends and shared the same passion for fishing, along with their brother Arthur. If there were medical anxieties, they would almost certainly have been discussed, at least informally. William, Arthur and Dorothy McNair have all died.

Denning (1899–1999) was called to the bar in 1923, became a KC in 1938, and a judge of the High Court of Justice in 1944. He was knighted in 1944 and created a life peer in 1957. In 1962 he was appointed Master of the Rolls. He died on March 5, 1999, 6 weeks after his 100th birthday, leaving a legacy few will match.

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