ACCIDENTAL SUBDURAL ANALGESIA:
A case report, possible clinical implications and relevance to “massive extradurals”

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SUMMARY
A continuous obstetric epidural is described, in which an abnormally extensive block and hypotension resulted. The catheter was subsequently shown to enter the subdural space. As this case resembles a “massive epidural”, it is suggested that subdural injection may explain the phenomenon.

Extradural blocks often exhibit atypical features. The case described was shown to be the result of a subdural injection of local anaesthetic agent. It is suggested that accidental injection into the subdural space may explain the “massive extradurals” described by Massey Dawkins (1969). Although subdural phenol injections are used in the relief of chronic pain (Maher, 1957), we can find no reports of subdural analgesia occurring during the performance of an extradural block.

CASE REPORT AND DISCUSSION
Mrs G., age 35 yr, weight 72 kg and height 5 ft. 3 in., was admitted at 38 weeks gestation with oedema and an arterial pressure of 160/110 mm Hg. Two of her three previous pregnancies had ended in full-term normal deliveries and the third in spontaneous abortion at 10 weeks. In addition, the patient had had a “slipped disc”, 8 yr previously, which was treated conservatively, resulting in a good recovery. Otherwise, there was no relevant past history.

Labour was induced by artificial membrane rupture and oxytocin infusion. An extradural injection was requested to control her hypertension and the increased pain of an accelerated labour. An extradural catheter was introduced easily at the level of lumbar 2/3, through a Tuohy needle using the technique of loss of resistance to saline. At this point, the arterial pressure was recorded at 150/105 mm Hg and the patient did not feel contractions. A test dose of 2 ml of bupivacaine 0.5% was injected and produced no symptoms or change in arterial pressure after 5 min. A further 6 ml was injected with the patient supine and her head on two pillows. Ten minutes later the arterial pressure had decreased to 130/80 mm Hg and after 20 min it was 110/60 mm Hg. The patient complained of tingling in both hands and, on testing, she had loss of pinprick sensation from the seventh cervical (C7) to the second lumbar (L2) segments. The arterial pressure did not decrease further, nor did the block extend. There was no change in foetal heart rate.

One hour later she was having good uterine contractions and her arterial pressure gradually increased over 30 min to 180/120 mm Hg. Analgesia was satisfactory at this point and the obstetrician injected hydralazine 5 mg i.v. and set up an infusion of diazepam and hydralazine to decrease the arterial pressure.

Thirty minutes later (2½ hr after the first injection), because the patient was feeling the contractions, 3 ml of bupivacaine 0.5% was injected. After 15 min the arterial pressure had decreased from 180/120 mm Hg to 130/90 mm Hg but as the pain was unaffected a further 7 ml of bupivacaine 0.5% was injected with the patient sitting. Analgesia was satisfactory 20 min after the 7 ml injection, although the arterial pressure had decreased to 100/60 mm Hg. Ten minutes later the patient felt faint, vomited and complained of numbness extending to her clavicles. The arterial pressure was recorded as 60 mm Hg systolic and the foetal heart rate at 90 beats/min. The maternal pulse rate, although not counted

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was never slow during these events. In view of the episode of hypotension, associated with foetal bradycardia and the atypical behaviour of the extradural, it was decided that it should be discontinued and that the hypertension should be controlled by hydralazine and diazepam.

The clinical features were not typical of a subarachnoid block, as the hypotension was delayed in onset and the sensory loss did not extend below L2. It was, however, too extensive for normal extradural block. Thus, we decided to keep the catheter in place and to determine the location of its tip after the delivery of the infant. The following morning an injection of radio-opaque contrast medium was used to demonstrate the location of the catheter tip and showed the contrast medium lying in the subdural space (Lombardi and Passerini, 1964).

Accidental subdural injection is quite common during the performance of myelograms especially when using long bevelled needles. Theoretically it could be a complication of extradural injection and under these circumstances a given volume of solution would be expected to spread over more segments when injected into the subdural space. This is confirmed in this case in which sensory loss extended from C7 to L2 after the injection of 8 ml and the injection of 3 ml of contrast medium is seen in the accompanying x-ray (fig. 1), to spread from approximately the seventh thoracic to the second lumbar segments.

Solutions injected into the subdural space may reach the cranial nerves. This may explain the "massive extradurals" described by Massey Dawkins (Dawkins, 1969). The experience of radiologists performing myelograms indicates that spread of solutions in the subdural space is slow and is concentrated dorsally. The rate of spread would explain the slow onset of signs and symptoms. The dorsal distribution would account for the relatively small effect on arterial pressure (considering the number of segments affected) observed in the massive extradurals and in the first dose in the above case.

The extradural space may be located by the detection of negative pressure, using an electromanometer or Odom's indicator. A negative pressure is found in 81% of extradural spaces (Dawkins, 1963). None of the five cases of massive extradurals in Dawkins' series, using the above methods, exhibited negative pressure before the injection of local anaesthetic (Dawkins, C. J. M., personal communication). This is highly suggestive of placement of the needle in an abnormal space.

The practical implications of this complication are that an extensive block with possible apnoea and hypotension can develop more than 20 min after an extradural injection without warning from the usual test dose, although it is possible that the hypotension was rendered severe only by the synergistic action of hydralazine and diazepam, since the "massive extradurals" described by Dawkins were characterized by a normal arterial pressure.

In the investigation of the position of a catheter near the lumbar theca, the radiographic contrast medium used should be safe in case of inadvertent subarachnoid injection. In all probability iophendylate (Myodil) should not be used as this reacts with some forms of plastic. The best contrast medium is probably iocarmic acid (Dimer X). This is water soluble and is used as a contrast medium in investigating lumbar cauda equina lesions, although contact of large quantities of iocarmic acid with the spinal cord should be avoided.
REFERENCES

ANALGESIE ACCIDENTELLE DU SUB-DURAL:
*Rapport sur un cas précis, implications cliniques possibles et applicabilité aux "extradurals massifs"

RESUME
On décrit dans cet article un épidural obstétrique continu qui a provoqué un blocage extensif anormal ainsi que de l'hypotension. On voit par la suite comment le cathéter a pénétré l'espace subdural. Comme ce cas ressemble à un épidural massif, les auteurs suggèrent qu'une injection du subdural pourrait expliquer le phénomène.

ZUFÄLLIGE SUBDURALE ANALGESIE:
Eine Krankengeschichte, mögliche klinische Konsequenzen und bedeutung für "massive ExtraduraJe"

ZUSAMMENFASSUNG
Beschrieben wird ein kontinuierliches Entbindungs-Epidural, bei dem es zu einer abnorm umfassenden Blockierung und zu einer Hypotension kam. Der Katheter erreichte den subduralen Raum, wie anschließend gezeigt wurde. Da dieser Fall einem "massiven Epidural" gleicht wird angenommen, daß das Phänomen durch eine subdurale Injektion erklärt werden kann.

ANALGESIA SUBDURAL ACCIDENTAL:
Informe de un caso, implicaciones clínicas posibles y relación con "extradurales masivas"

SUMARIO
Se describe un epidural obstétrico continuo en el que resultó un bloqueo anormalmente extensivo y hipotensión. Posteriormente se vio que el catéter entraba en el espacio subdural. Como este caso se parece a una "epidural masiva", se sugiere que la inyección subdural puede explicar el fenómeno.