

AN ARTHUS REACTION TO LOCAL ANAESTHETIC

(A Case Report)

by

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Anaphylactic reactions to local anaesthetics have been reported since the start of their clinical use. Fatal results have often been reported by Gordh (1965), Salupere (1967), Muller (1968) and Oberlander (1969). The incidence of this reaction has increased tremendously since the introduction of procaine penicillin (Avksent'eva, 1966, Khodanova, 1967, Starzyeki, 1968, Suzuki, 1968 and Idsoe, 1969).

In contrast to this immediate type of systemic allergic reaction (anaphylaxis) the incidence of immediate local allergic reaction (Arthus reaction) is very negligible. This type of lesion is characterised first by a circumscribed area of redness and oedema; induration appears later and, finally, haemorrhage and necrosis. A search of the literature failed to reveal any report of Arthus reaction to local anaesthetics. In view of this, the following case history is reported.

Case Report

Mrs. De, a primigravida of 24 years was admitted in Sir Kedarnath maternity ward

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of R. G. Kar Medical College Hospital, Calcutta, at 39 wks. of pregnancy. At the time of admission she was of average build and nutrition, body weight-46 kg., B.P.—139/90, oedema feet ++, anaemia nil, uterus-term size, vertex presentation with engaged head and normal foetal heart sounds. There was no past history of injection of procaine penicillin or local anaesthetics.

Two days after admission labour pains started following administration of castor oil and enema. Due to slow progress of labour after 12 hours, syntocinon drip (2.5 units/560 ml 5% glucose) was started at the rate of 25-30 drops per minute. Within 5 hours, the labour progressed rapidly to full dilatation of the cervix except for a thin rim. The position of the foetus was L.O.T. and the head was below the level of ischial spines with formation of a small caput.

As labour did not progress within the next 2 hours, forceps application was contemplated after use of local anaesthetic for episiotomy.

Five ml of 2% localin (lignocaine hydrochloride, 2% with methyl paraben, 0.1%) diluted with equal volume of sterile distilled water without adrenaline was infiltrated locally (on both sides of the vulva and also near the perineum).

Immediately after the local injection the patient developed shock with a fall of blood pressure (96/56) and an increase in pulse rate (116/min.). The patient also developed a huge oedematous and red area at the site of injection within 8 hours which was mistaken as an area of vulval haematoma.

Although the patient recovered completely from the shock after appropriate treatment and the foetus was delivered by for-

ceps, the lesion at the site of local injection progressed. The area became whitish and necrotic within 2-3 day, black and hard in 7-8 days and completely sloughed within 14 days (Fig. 1).

The necrosed ulcer was dressed regularly with neosporin and chloromycetin after washing with H_2O_2 and normal saline. The ulcer healed by granulation tissue and fibrosis within 7 weeks and later on was completely covered by skin. The patient was discharged after 11 weeks of admission.

Pathological investigations:

Blood examined on the 3rd day of the reaction showed the following results: Hb-13 gm per cent, total W.B.C.-4,200/c. mm. with neutrophils-48 per cent, lymphocytes-47 per cent, monocytes-1 per cent and eosinophils-4 per cent. E.S.R.-12 mm/1st hour.

Routine examination of urine and stool: Except a trace of albumin in the urine nothing abnormal was detected.

Simultaneous appearance of shock and manifestation of local necrotic lesion at the site of injection led us to suspect that the local condition might have been caused by Arthus type of reaction. So the patient's serum was used to demonstrate passive Arthus reaction in guinea pig.

Passive Arthus reaction in guinea pig: Serum separated from the blood collected from the patient on the 3rd day of the reaction, was used in this experiment. 0.5 ml of serum was injected subcutaneously in the flank of an adult guinea pig after depilation. The same amount of normal saline was injected subcutaneously in the opposite flank which served as a control. After waiting for an hour to allow fixation of the antibody, 0.5 ml of the diluted localine with an equal volume of normal saline was injected intravenously after mixing with 1 ml of 1% trypan blue. Two hours after the injection the guinea pig developed a patch of oedema with bluish colouration (Fig. 2) at the site of injection of serum but the skin of the control site was found to be normal. After 24 hours of injection the reaction site showed haemorrhagic spots, induration and patchy areas of necrosis. Histological section (Fig. 3) of the biopsied material

from the affected area showed dilated venules with intra-vascular thrombosis and extravasation of large number of neutrophils surrounding the vascular wall—the typical picture found in Arthus type of reaction.

Discussion

An Arthus reaction is a localised form of immediate allergic manifestation and is produced as a result of union between the antigen and antibody molecules in the wall of the blood vessels, specially in the venous walls. The antigen-antibody complexes presumably result from the meeting of blood-borne antibody with the antigen diffusing from the local depots or *vice versa* (found in passive Arthus reaction). As these complexes damage the vascular endothelium, intravascular thrombosis is a dominant feature. This is followed by localised necrosis of the tissue and extravasation of neutrophilic leucocytes. These cells migrate in increasing number to engulf the antigen-antibody complexes, both free in the tissue spaces and found within the vessel walls.

Although the antibody to the drug localine was found to be present in the patient's serum by experiment in the guinea pig, a previous history of injection of local anaesthetics or procaine penicillin was lacking. Thus the cause of primary sensitisation cannot be explained in this patient.

In the guinea pig, the experimental reaction can be explained by postulating that the antibody in the serum becomes fixed to the vascular wall, which reacts with the circulating antigen and precipitates Arthus type of reaction. Local damage of the vascular endothelium helps in permeation of trypan blue colouration of the skin patch.

The incidence of Arthus reaction in clinical practice after injection of local anaesthetic is, however, very rare. The

present case was explained by some as a vulval haematoma and immediate interference was advised.

That simultaneous appearance of anaphylactic reaction (evidenced from shock and leucopenia) and Arthus reaction is an extremely uncommon event, but this helped us to diagnose the condition early.

Summary

A rare case of Arthus reaction after injection of local anaesthetic for episiotomy has been reported. The reaction has been confirmed by demonstration of passive Arthus reaction in guinea pig with the patient's serum.

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References

1. Avksent'eva, T. A.: *Akush. Ginek. (Moskva)*. 42: 43, 1966.
2. Gordh, T.: *Acta Anaesth. Scan. Suppl.* 16: 137, 1965.
3. Idsoe, O.: *Schweiz. Med. Wschr.* 99: 1221, 1969.
4. Khodanova, R. N.: *Vestn. Otorinolaring.* 29: 113, 1967.
5. Muller, M.: *Med. Leg. Domm. Corpor (Paris)*. 1: 70, 1968.
6. Oberlander, J.: *Z. Aerztl. Fortbild (Jena)*. 63: 48, 1969.
7. Salupere, V. P.: *Vrach. Delo*. 5: 135, 1967.
8. Starzyeki, Z.: *Przegl. Derm.* 55: 559, 1968.
9. Suzuki, T.: *Jap. J. Leg. Med.* 22: 227, 1968.

See Figs. on Art Paper VII