tivity remained a possibility, and subjects with rashes were advised to warn doctors in the future of the possibility of their being sensitized. The mechanism of the phenomena is obscure, the drug, the vaccination lesion, and light all playing a part.

Summary

In the control of streptococcal infections in an R.A.F. station prophylactic sulphonamides were administered in a dosage of 2 g. daily for ten days to 470 personnel.

A high incidence (34.6%) of photosensitization rashes occurred, due to a combination of three factors—the sun, vaccination, and sulphanilamide.

The highest incidence of rashes was found in men recently vaccinated, and coincided with the development of the pustular stage even when this occurred after the drug had been suspended. No rashes appeared in personnel in whom vaccination had failed or was refused.

The literature relating to toxic reactions occurring in the use of prophylactic sulphonamides and to sulphonamide photosensitivity is discussed.

The evidence produced shows that a combination of sulphanilamide administration to ambulatory personnel and vaccination will cause a high incidence of transient photosensitization rashes.

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BELLADONNA POISONING

BY

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Glaister (1944) states that cases of accidental poisoning by belladonna preparations are comparatively rare. The following case is, we think, unusual enough to merit publication.

Case Report

A corporal in the Polish Air Force, aged 42, was admitted to a Royal Air Force hospital at 11.20 p.m. on Nov. 4, 1946. He was unable to give a clear account of himself, and the history was obtained from a sick-quarters orderly. The patient reported to the station sick quarters at 4.15 p.m. complaining of vague abdominal discomfort. He was given some medicine, stated to be a gastric mixture. About 7 p.m. others sharing his billet noticed his confused state and took him to the sick quarters, whence he was transferred to hospital. Before admission he was given omnopon, 1/3 gr. (22 mg.), and scopolamine, 1/150 gr. (0.43 mg.).

On admission he was found to be in an extremely restless and agitated condition. While awaiting transfer to a ward he

wandered aimlessly round the reception-room, picking up every object he encountered, including a telephone directory and the curtain, and attempting to eat it. He was unable to appreciate his surroundings, and failed to recognize the friends who accompanied him. His speech, which was thick and confused, consisted of an unintelligible jargon. His gait was reeling and incoördinate. In the ward he strongly resisted attempts to undress him. Resistance was accompanied by vague gestures of physical violence, which soon gave way to an air of fatuous resignation.

On physical examination the face was markedly flushed, the mouth dry, and the tongue coated with a heavy brown fur. The breath was not offensive. The temperature was 98.4° F. (36.9° C.). The pulse rate was 122, and its rhythm and tension were within normal limits. The blood pressure was 150/90. Examination of the heart, chest, and abdomen was negative. On admission the respiratory rate was 20. The bladder was distended, being felt 3 in. (7.5 cm.) above the symphysis pubis. The pupils were circular, equal, and widely dilated, with only a thin surrounding rim of iris. They reacted sluggishly to direct and consensual light. There was no nystagmus, and eye movements were full. The fundi were normal. There was a generalized muscular hypertonus, amounting almost to spasticity. The tendon reflexes were exaggerated. The abdominal reflexes were elicited with difficulty, and the plantar responses were flexor. Some ill-sustained ankle clonus was observed, but no patellar clonus. Sensory examination was unsatisfactory owing to the mental state.

Attempts to pass a gum-elastic catheter failed owing to an obstruction in the region of the membranous urethra. However, some 30 minutes later he passed a large quantity of urine, a specimen of which contained no chemical abnormality. In view of the widely dilated pupils, flushed face, dry mouth and tongue, mental state, tachycardia, and distended bladder, a tentative diagnosis of belladonna poisoning was made. As the patient soon became more rational and co-operative, no active measures were indicated. He slept well, and no further confusional symptoms occurred.

On awaking the following morning he was somewhat bewildered, and was amnesic for the events of the previous evening, the last episode he remembered being the administration of some "black medicine." Physical examination was now entirely negative apart from the pupils, which were still somewhat dilated and reacted sluggishly to light. He was mentally alert. Information was received that the "black medicine" was not, as intended, 10 min. (0.59 ml.) of tincture of belladonna, but 10 min. of the liquid extract of belladonna. On Nov. 6 he was mentally and physically normal, and was returned to his unit. Five months later he was in good health. He stated that 10 to 15 minutes after taking the medicine he noticed difficulty in focusing near objects, presumably due to failure of accommodation. A dose of 1 min. (0.059 ml.) of liquid extract of belladonna by mouth produced no ill-effects, except slight dryness of the mouth occurring after one hour and persisting for about 45 minutes. There was no change in pulse, respiration rate, or size of the pupils. It is therefore concluded that there was no element of idiosyncrasy.

Discussion

In this case acute symptoms of belladonna poisoning, followed by rapid recovery, resulted from the administration of a dose which was small compared with that in previously recorded cases. The dose was 20 times that intended: 10 minims of the extract being equivalent to 1/15 gr. (4.3 mg.) of alkaloids, while 10 minims of the tincture is equivalent to 1/300 gr. (0.22 mg.) of alkaloids, calculated as hyoscyamine. Clinically the case conformed fairly well to standard descriptions, but the disordered behaviour, the hypertonus, and the transitory urinary retention (due, presumably, to spasm of the external sphincter) were noteworthy.

Most of the cases described in the literature have followed the external applications of belladonna preparations. Moorhead (1919) described two cases following the absorption of belladonna liniment through the unbroken skin after

massage. Métivier (1935), Duggan (1937), and Hopkins and Robyns-Jones (1937) recorded cases due to the instillation of atropine eye solutions. The last mentioned occurred with washing out the eye with 1% atropine solution after an iridectomy operation. Carter (1940) described the case of a man who swallowed 5 drachms (19.4 g.) of the liniment (equivalent to $1\frac{1}{2}$ gr. (90 mg.) of alkaloid) in mistake for a cough mixture. The onset of symptoms was delayed 10 hours, and complete recovery followed treatment by spinal drainage, morphine, and physostigmine.

Glaister comments on the variations in dosage found to cause symptoms: 2 gr. (0.13 g.) of atropine have proved fatal, while recovery has followed a dose of $5\frac{1}{2}$ gr. (0.35 g.). Although in our case the amount was ten times the pharmacopoeial dose of the liquid extract (1 min.), the dosages in previously recorded cases have generally been much higher. It appears, therefore, that symptoms of poisoning accompanied by a gross mental disturbance can result from only a moderately excessive dosage.

Summary

A case of accidental belladonna poisoning is described, presenting as an acute confusional state.

The onset of visual symptoms occurred within half an hour of taking 10 minims of the liquid extract, while the onset of general symptoms was delayed for three hours.

Recovery occurred within twelve hours without active treatment.

Subsequent testing for idiosyncrasy proved negative.

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SUPPRESSION OF SYPHILIS AND PRECOCIOUS TERTIARISM

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In cases of early syphilis treated with penicillin in standard doses (2,400,000 units or more) relapse or failure of treatment may be manifested in the following ways (Marshall, 1945): (a) Surface relapse. The relapse lesions may be "primary" or "secondary" in type and have occurred, in patients treated personally, between 59 and 200 days after treatment (average 83 days). (b) Serological relapse, which may occur with or without signs of surface relapse. (c) Sero-resistance. (d) Less common types of treatment failure include neuro-recurrence, ocular and osseous relapse, and persistence of *Treponema pallidum* in surface lesions in spite of treatment.

Precocious tertiarism has not, until now, occurred as a manifestation of relapse in any of the patients I have treated with penicillin alone. This phenomenon has usually been seen in the past in patients who had been inadequately treated for syphilis by a few injections of a trivalent arsenical unsupported by bismuth. It is presumed that the rapid destruction of the spirochaetes by arsenicals deprives the body of its one primordial and essential stimulus to fight

the infection on its own account—namely, the presence over a long period of the pathogenic agent (Stokes *et al.*, 1944).

There is good presumptive evidence that the administration of an inadequate dosage of penicillin in the following case of early syphilis has upset the normal response of the body tissues to infection with *T. pallidum*.

Case Report

A man aged 30 was first seen in June, 1947, and attended for examination because his wife had been found, at routine antenatal test, to have latent syphilis. (He had been married for one year, and, as a pre-marital serum test for syphilis is obligatory for women marrying serving American soldiers, it can be presumed that his wife was then healthy.) He had not previously shown any manifestations of any venereal disease and gave the following history.

In November, 1945, while on active service in Italy with the U.S. Army, he developed a very itchy rash on the sides of the neck, anterior borders of axillae, trunk, and genitals. The limbs, apart from the upper thighs, were unaffected. The rash did not begin on the genitals and he could not recall any genital ulceration before this time. His last exposure to infection was, he thinks, some six to nine months previously. A diagnosis of scabies was made and he was treated intensively with benzyl benzoate on several occasions over three weeks without relief. At the end of this time he was given 15 or 16 injections of penicillin over two or three days. Individual doses were of 40,000 units, presumably in aqueous solution. The effect was the disappearance of the rash and of the itching in a few days.

It was a routine procedure in his unit for all men to have a serum test for syphilis every six months. He had had tests with negative results in July, 1945 (before the rash), and again a month or two after penicillin treatment.

From November, 1945, he remained in apparently good health, without any skin lesions, until about five weeks before he first attended my clinic. He then developed a rash on his forehead. A few days afterwards a similar rash appeared on his chin, followed a little later by lesions on the penis. Two weeks after the first signs there appeared a spreading lesion of a different type on his left thigh. In the earliest days he had had a sore throat. He had had a serum test for syphilis at a U.S. Army dispensary about a week before he attended, and this was reported as positive.

On examination there were surface lesions of the face, penis, left thigh, and buccal mucosa. The facial lesions consisted of a band of dusky erythema, an inch (2.5 cm.) wide, extending all along the hair margin of the forehead, scaling at the edges and closely studded with pinhead pustules; there was a similar circular patch, one inch in diameter, on the centre of the chin. The mouth showed superficial ulceration of the mucous membrane of the left tonsil and of both commissures of the cheeks. On the shaft of the penis were numerous small purplish oval or circular papules, some eroded, of the type commonly associated with relapsing early syphilis.

On the anterior surface of the middle of the left thigh was a lesion of a different type. This was a roughly circular brown scaling patch, about two inches (5 cm.) in diameter, with a serpiginous edge. The edge showed signs of active spread and had scattered reddish-brown or bluish nodules with superficial scaling. The whole lesion was, clinically, a typical superficial nodular cutaneous gumma. There was moderate enlargement of the lymph glands of the posterior triangle of the neck, of the epitrochlear glands, and of the inguinal glands on both sides.

Dark-ground examination of serum from a penile lesion showed no *T. pallidum*, but in view of the positive serum test, confirmed locally, treatment was not delayed. It was not possible to arrange for lumbar puncture before beginning treatment.

The treatment given on the first day consisted of 0.09 g. "neohalarsine" and 0.2 g. bismuth oxychloride. Three days later the pustular lesions of the face had disappeared, leaving areas of erythema dotted with brownish pigmented spots. The penile lesions had disappeared and the lesion of the thigh was