Gram-positive bacilli, mainly extracellular in position, at first thought to be *Haemophilus influenzae*, in view of the ease with which they could be decolorized, but subsequently identified as *Listeria monocytogenes*. Similar organisms were isolated from the blood culture after 48 hours' incubation. The organism was resistant to penicillin but sensitive to tetracycline, erythromycin, streptomycin, chloramphenicol, and sulphonamides. The haemoglobin was 17.5 g./100 ml., white-cell count 15,800/c.mm. (36% polymorphonuclear leucocytes, 60% lymphocytes, 4% monocytes).

Treatment was started with intravenous fluids. Crystalline penicillin, 400,000 units intramuscularly, chloramphenicol, 75 mg. intramuscularly, and sulphadiazine, 150 mg. subcutaneously, were given six-hourly. Penicillin was stopped on the second day and the chloramphenicol and sulphadiazine were given orally after three and five days respectively. Intravenous fluid was discontinued after two days.

The child made an excellent response to treatment. On the third day he was afebrile and started to gain weight; there were no abnormal physical signs five days after admission, and chloramphenicol and sulphadiazine were discontinued.

Lumbar puncture was repeated at the end of the third week of the illness, the C.S.F. was sterile, the sugar 44 mg. and protein 150 mg./100 ml. Further progress was interrupted by a mild chest infection, but the child was discharged apparently well and gaining weight after five weeks in hospital.

Morphology.—The organism on first isolation was a small, short, Gram-positive rod resembling a diphtheroid bacillus. Some V forms were present. It could be easily made to appear Gram-negative by decolorization with acetone. Filamentous forms appeared after repeated subculture.

Cultural Characteristics.—Growth occurred fairly well on a variety of solid media. On blood-agar incubated at 37° C., slightly opaque, smooth domed colonies, less than 1 mm. in diameter, were visible after 18 hours. After 48–72 hours the colonies were 2–3 mm. in diameter, milky in appearance, and with fimbriate edges. A narrow zone of clear (beta) haemolysis was present around the colonies on blood-agar. The presence of a soluble haemolysin was confirmed by the method of Webb and Barber (1937). On blood tellurite, minute black colonies were just visible in 18 hours; no growth was apparent on MacConkey's medium after 36 hours. After repeated subculture "rough" colonies (Barber, 1939) could be distinguished.

Motility.—The tumbling motility said to be typical of *Listeria monocytogenes* could be seen in glucose-broth cultures grown at room temperature for 18 hours.

Biochemical Reactions.—The organism produced acid but not gas from maltose, glucose, xylose, and salicin within 36 hours and from lactose and sucrose in five days. Dulcitol and mannitol were not fermented. Urea was not split on Christenson's medium; hydrogen sulphide and indole were not formed. There was no growth in Koser's citrate, the methyl-red test was positive, and the Voges-Proskauer reaction negative.

Antibiotic Sensitivities.—Strips of filter-paper, soaked in solutions of antibiotics, incorporated in nutrient agar, were used for testing antibiotic sensitivities. Organisms of known sensitivity were used as controls.

Production of Monocytosis in Rabbits.—The conjunctival sac of one eye of each rabbit was infected with a swab

dipped in an 18-hour glucose-broth culture. The blood monocytosis in two rabbits is shown in the Table. After recovery from the conjunctivitis, the rabbit conjunctival test was performed on one rabbit and local immunity demonstrated (Julianelle, 1941).

Serology.—A rabbit antiserum of a titre of 1/2,000 to a known strain of *Listeria monocytogenes* agglutinated a formalized suspension of the organism at 1/1,000.

Serological Investigations of the Patient's and Mother's Serum.—No agglutinating or complement-fixing antibodies to formalized suspensions of the organism were detected on sera taken from the patient on the 11th and 25th days of the illness or in the mother's serum 37 days after delivery. The patient's serum gave a negative Paul-Bunnell reaction. Dr. D. G. Ingram determined the immuno-conglutinin titre of the patient's and the mother's serum. No activity was detected in the mother's serum, but the second serum from the patient showed a significant rise in titre compared with the first, indicating that an antibody response had occurred.

COMMENT

Listeria monocytogenes has been confused with streptococci, pneumococci, diphtheroids, and *E. coli*. In this case, as in that described by Selinger and Becker (1955), the ease with which the organism could be decolorized led to a provisional diagnosis of *H. influenzae* meningitis. Penicillin therapy was therefore discontinued. Fortunately, treatment with chloramphenicol and sulphadiazine was remarkably effective.

Though this case is an exception, resistance to penicillin seems to be uncommon. Of six cases described in Great Britain within the last three years the organism was found to be sensitive to penicillin in five, and in the United States *Listeria monocytogenes* appears to be more often sensitive to penicillin than to chloramphenicol (Dedrick, 1957).

We thank Captain Thomas L. Evans, U.S.A.F., for the clinical details of this case, and Dr. D. G. Ingram, late of the department of pathology, University of Cambridge, for determining the immuno-conglutinin titre and supplying the antiserum.

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Arthrodesis of the Great Toe

Keller's operation is still the most frequently performed operation for hallux valgus and rigidus. The results are often good, but they are not reliable. In my view the main reason for this is that metatarsalgia is often not relieved. In the normal foot the weight taken by the forefoot is divided mainly between the metatarsal heads and the tip of the great toe. The other toes take a relatively small proportion of the weight. In a severe hallux valgus the great toe deviates so far laterally that its tip takes only a little weight and the metatarsal heads

Monocytic Response in Rabbits to *Listeria Monocytogenes*

Date	Rabbit 1		Rabbit 2	
	Total W.B.C./c.mm.	Monocytes/c.mm.	Total W.B.C./c.mm.	Monocytes/c.mm.
3/2/59	10,000	750	6,000	450
4/2/59, conjunctival inoculation	8,000	760	7,000	630
6/2/59	9,000	1,350	9,000	990
8/2/59	11,000	1,760	8,000	1,840
10/2/59	15,000	2,850	8,000	1,680
12/2/59	10,000	1,200	8,000	1,400

take the greatest part. This I believe to be the main cause of metatarsalgia. Only if Keller's operation is successful in restoring both the normal position and the mobility of the great toe will it relieve metatarsalgia. If Keller's operation is done on a very severe hallux valgus where there is a much broadened forefoot with metatarsal prolapse and callosities the result is often a great toe still deviated laterally and upwards, with little power of active flexion, even though passive movements are quite good. In such a foot only the local pain from the first metatarsal exostosis is relieved but not the metatarsalgia.

I have reviewed an earlier series of 75 cases of hallux valgus and rigidus in which Keller's operation was performed 109 times. In 20 feet there was persistent metatarsalgia of varying degree. Bonney and McNab (1952) report a high incidence of metatarsalgia persisting after Keller's operation.

Arthrodesis of the first metatarsophalangeal joint is a logical operation in hallux rigidus. It was often observed that when a hallux rigidus became completely stiff the pain disappeared. It is also effective in hallux valgus, because it corrects the defective weight distribution. When the great toe is arthrodesed in a satisfactory position its tip takes the normal proportion of the weight again and relieves the metatarsal heads.

Various methods of arthrodesis for the first metatarsophalangeal joint have been put forward. They have not become popular because they are too time-consuming and make the operation a relatively major undertaking.

OPERATION

A small pair of bone-cutting forceps, a Watson-Jones guide-wire handle, a small round punch, and a Pidcock check pin are needed in addition to the usual instru-

ments for Keller's operation. The incision is a straight dorsal one, just medial to the long extensor tendon. The distal half of the first metatarsal and most of the proximal phalanx are exposed subperiosteally (see Fig.). The exostosis on the metatarsal head is removed, leaving the adventitious bursa in place. The joint surfaces on the metatarsal head and the base of the proximal phalanx are then excised, leaving two flat congruous cancellous surfaces. The joint under the metatarsal head with the sesamoids must be preserved. The toe is held in the correct position. The Pidcock pin held in the Watson-Jones handle is used to transfix the base of the proximal phalanx and the metatarsal head obliquely (see Fig.). The Pidcock pin is then hammered home, using the small punch. Firm fixation is obtained. The wound is sutured in two layers.

The correct position is with the toe in about 10 degrees valgus (see Fig.) and 20 degrees dorsiflexion. If the toe is arthrodesed exactly in line with the first metatarsal it is difficult to get well-fitting shoes with a straight inner border. 20 degrees of dorsiflexion is quite sufficient for wearing shoes with a medium heel, but it is essential to warn ladies that they cannot wear a very high heel.

AFTER-TREATMENT

No splinting is required during the first fortnight, when the patient is in bed. A below-knee walking-plaster is then applied, including the great toe. This is worn for another four weeks. Fusion is then usually complete.

Patients should be warned that it takes about three months to get a good result. For about six weeks after the plaster is removed the foot is rather swollen, walking is awkward, and shoes are difficult to fit. This is really no longer than convalescence after Keller's operation.

RESULTS

During a period of three years 110 operations were done for 72 patients; 38 were bilateral and 34 unilateral. Nine operations were for hallux rigidus, two for failed Keller's operation, and all the others for hallux valgus. Sex and age distribution was as expected, with a large preponderance of women between 40 and 60, but seven patients were between 20 and 30 and one was over 70.

I have classed results as good in 100 feet, fair in 9, and poor in 1. This one was due to a late wound infection (the only one) causing non-union and recurrence of the deformity. Twenty-four patients had metatarsalgia before operation, and afterwards six patients still had metatarsalgia in seven feet. In two feet the toe had been arthrodesed in line with the first metatarsal instead of in 10 degrees valgus and there was pressure from shoes. Fusion failed in five feet: in two of them the operation was repeated successfully; two more had a trouble-free short fibrous ankylosis. In 18 feet the pin loosened and was extruded. It either penetrated the skin spontaneously or was removed under local anaesthesia. This is not a serious disadvantage; in fact, there was no other wound infection.

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