be taken out as she wanted a further pregnancy. The overall continuation rate in our clinic is shown in table IV—after one year 69% were continuing with the Shield.

Discussion

The reintroduction of intrauterine contraceptive devices in the early 1960's was initially followed by widespread enthusiasm and then growing dissatisfaction. The pregnancy and expulsion rates were higher than expected and side effects of pain or bleeding or both necessitated a high proportion of removals. The evidence suggested that a local endometrial action manifesting as a macrophage response, presumably chemotactically induced, prevented conception (Sagioglu and Sagioglu, 1970; Sedlis and Reyniak, 1970). Davis (1971) then postulated his surface interaction hypothesis that the antifertility effect of an inert I.U.D. bore a direct relation to the surface area of contact between the I.U.D. and the endometrium. Bearing these two points in mind the Dalkon Shield was developed by Davis, a gynaecologist, and Lerner, a bioengineer. Clinical trials conducted by Davis and his associates have been most enthusiastic (Davis, 1971).

This study, however, has shown a much higher complication rate than that reported by Davis. The pregnancy rate for example is much above that of 1.1/100 users at 12 months of use and corresponds more to the 3.8/100 users after one year found in the multicentre U.K. study reported by the Family Planning Research Unit of the University of Exeter (Snowden and Williams, 1973) in which there is no information about the number of women who used a spermicide in addition to the Shield. In the present report about 5% of participants who asked to use a spermicide did so intermittently.

The expulsion rate of 6.3/100 users in a year is again greater than the 2.3/100 users at 12 months reported by Davis (1971). This rate, however, is much lower than the expulsion rates ascribed to the more generally used I.U.D.s such as the Lippes Loop C and the Saf-T-Coil of 19 and Lippes Loop D of 12.7/100 users at 12 months' use (Kleinman, 1972).

The figures for medical removal rates will be greatly influenced by individual doctors' attitudes to this particular

problem. Nevertheless our rate corresponds closely to that of 9.7/100 users at one year reported by Ostergard and Broen (1971) and is approaching the removal rates of 11.0/100 users at one year for the Lippes Loop (Tietze and Levit, 1970). The Exeter survey reported a much lower removal rate for the Shield (4.6/100 users at one year), while the figures of Davis again are the lowest recorded at 2/100 users at one year.

The continuation rate of 69% at our clinic after one year of use again puts the Dalkon Shield on a par with more conventional I.U.D.s (Kleinman, 1972).

Conclusion

The information presented here from 3,028 months of use of the Dalkon Shield in 377 women suggests that this device has a pregnancy and medical removal rate similar to those ascribed to the Lippes Loop. However, the low expulsion rate seen in our study indicates that the Shield is superior in this respect. Thus we think that the Shield is an advance in intrauterine contraception but that the complication rate quoted by Davis is an under-estimation. The failure of this device, with its large endometrial contact area, to affect the pregnancy rate, must, if confirmed by other studies, question the existing hypotheses of mode of action of the so-called inert I.U.D.s.

Reprint requests should be addressed to: Mr. Max Elstein, Department of Human Reproduction and Obstetrics, University of Southampton, Southampton SO1 6HU.

References

- Davis, H. J. (1970). *American Journal of Obstetrics and Gynecology*, 106, 455.
- Davis, H. J. (1971). *Intrauterine Devices for Contraception. The I.U.D.*, Baltimore, Williams and Wilkins.
- Kleinman, R. (1972). *Intrauterine Contraception*, 3rd edn. London, I.P.P.F. Publications.
- Ostergard, D. R., and Broen, E. M. (1971). *Contraception*, 4, 313.
- Sagioglu, N., and Sagioglu, E. (1970). *American Journal of Obstetrics and Gynecology*, 106, 506.
- Sedlis, A., and Reyniak, J. Z. (1970). *American Journal of Obstetrics and Gynecology*, 108, 1209.
- Snowden, R., and Williams, M. (1973). *Contraception*. In press.
- Tietze, C., and Levit, S. (1970). *Studies in Family Planning*, No. 55, 1.

MEDICAL MEMORANDA

Cricoarytenoid Arthritis in Ankylosing Spondylitis

J. A. WOJTULEWSKI, R. D. STURROCK,
A. C. BRANFOOT, F. D. HART

British Medical Journal, 1973, 3, 145-146

Cricoarytenoid arthritis has been described in association with rheumatoid arthritis on numerous occasions (Montgomery *et al.*, 1955; Copeman, 1957; Pearson, 1957; Polisar, 1959), and its presence may lead to serious anaesthetic and respiratory

problems (Montgomery *et al.*, 1955; Baker and Bywaters, 1957; Polisar, 1959). So far as we are aware involvement of this joint in ankylosing spondylitis has not been previously reported in the English literature.

Case 1

A man aged 64 with a history of ankylosing spondylitis since 1944 was seen in the rheumatism clinic in 1965. He had been subject to recurrent attacks of iritis, and x-ray pictures of his spine showed severe changes of ankylosing spondylitis. Both hips were involved, and a synovectomy had been performed on the left knee for recurrent effusions. The Rose-Waaler and latex tests were negative.

Since 1956 his voice had become increasingly husky and he had noticed progressive shortness of breath with a constant feeling of obstruction in the throat. Chest x-ray examination showed an old tuberculous focus but no other abnormality. Indirect laryngoscopy showed very little movement of the vocal cords, and on direct laryngoscopy both arytenoid cartilages appeared fixed with no abduction of the cords occurring on inspiration.

In 1966 he became dyspnoeic at rest and developed a pronounced inspiratory and expiratory stridor. A tracheostomy and subsequent left Woodman's operation was performed, and at operation gross

Westminster Hospital, London SW1P 2AP

J. A. WOJTULEWSKI, M.B., M.R.C.P., Research Registrar
R. D. STURROCK, M.B., M.R.C.P., Research Registrar
A. C. BRANFOOT, F.R.C.S., M.R.C.PATH., Senior Lecturer, University Department of Morbid Anatomy
F. D. HART, M.D., F.R.C.P., Consultant Physician

arthritis of the left cricoarytenoid joint was noticed. The histological appearances of the removed left arytenoid cartilage are shown in the figure.

Histological appearances of arytenoid cartilage. Rheumatoid pannus replaces the articular surface (below) and invades metaplastic bone with fatty marrow (across centre) and partly calcified cartilage (above).

A right Woodman's operation was necessary in 1967, and since that time the patient has had a permanent tracheostomy and no further respiratory problems.

Case 2

The patient was a 51-year-old man with ankylosing spondylitis diagnosed in 1942 when he was aged 21. He was first seen at Westminster Hospital in 1953 and found to have severe ankylosing spondylitis with peripheral joint involvement and iritis. At that time he complained of huskiness of the voice which had been present for one year, and in 1954 he lost his voice completely for several days. Indirect laryngoscopy showed hyperaemic cords with impaired abduction on inspiration.

In May 1972 he was admitted for consideration of a bilateral hip arthroplasty. On examination at that time he had a rigid spine and involvement of the peripheral joints, including the temporomandibular articulations. His voice was husky and weak and he complained of a constant throat irritation. Indirect laryngoscopy was impossible due to an inability to extend the cervical spine. Endotracheal intubation before a general anaesthetic was attempted on three separate occasions and succeeded only after cricothyroid puncture, retrograde nasal catheterization, and "rail-roading" a cuffed endotracheal tube into place. There were no postoperative complications and both hips have now been replaced.

Comment

Cricothyroid arthritis has attracted much interest in recent years, although it is worthy of note that by the second half of the last century "rheumatism" of the larynx was an accepted and a well documented condition (Mackenzie, 1894; Polisar, 1959). Synovitis of the cricothyroid joint due to "rheumatism" and "gout" was thought to be a definite entity, although at that time laryngeal disease due to typhoid fever, syphilis, diphtheria, tuberculosis, gonorrhoea, and the infectious fevers dominated the scene.

When cricothyroid involvement is currently discussed in the context of a generalized arthritic disorder, this is almost invariably understood to mean rheumatoid arthritis. There are, however, case reports (Montgomery, 1963) describing this condition in gout, Reiter's disease, systemic lupus erythematosus, and Tietze's syndrome, but not all these cases stand up to critical analysis. Several cases of acute cricothyroid arthritis after immobilization of the cervical spine in plaster have been reported from France (Rebattu *et al.*, 1951), including two patients suffering from ankylosing spondylitis.

The histological features of cricothyroid involvement in rheumatoid arthritis have been well documented (Bienenstock *et al.*, 1963; Gardner, 1972) but do not appear to have been described in ankylosing spondylitis. In our first case the histological appearances were similar to those seen in rheumatoid arthritis.

The fact that this joint may become involved in patients with ankylosing spondylitis may be of clinical significance, and as in rheumatoid arthritis there is a case for treating upper respiratory tract infections vigorously when they occur. The spondylitic neck is troublesome enough to the patient, and here is yet another complication in this region to add to his misery.

Our second case stresses the potential anaesthetic difficulties in this disease providing an anaesthetist's nightmare consisting of an immobile flexed neck, limited mouth opening due to temporomandibular involvement, an immobile chest wall, and a diminished glottic aperture due to adducted and scarcely mobile vocal cords. Happily, with the rapid development of new anaesthetic techniques most of these problems can now be overcome.

References

- Baker, O. A., and Bywaters, E. G. L. (1957). *British Medical Journal*, 2, 1400.
- Bienenstock, H., Ehrlich, G. E., and Freyberg, R. H. (1963). *Arthritis and Rheumatism*, 6, 48.
- Copeman, W. S. C. (1957). *British Medical Journal*, 2, 1398.
- Gardner, D. L. (1972). *Pathology of Rheumatoid Arthritis*, p. 79. London, Edward Arnold.
- Mackenzie, G. H. (1894). *Edinburgh Medical Journal*, 40, 507.
- Montgomery, W. W. (1963). *Laryngoscope*, 73, 801.
- Montgomery, W. W., Perone, P. M., and Schall, L. A. (1955). *Annals of Otology, Rhinology and Laryngology*, 64, 1025.
- Pearson, J. E. G. (1957). *British Medical Journal*, 1, 1047.
- Polisar, I. A. (1959). *Laryngoscope*, 69, 1129.
- Rebattu, J., Martin, J., Gaillard, J., and Chosssegros, H. (1951). *Lyon Medical*, 18, 25.