

enlevée. Une véritable spasticité du sphincter externe semble être le principal facteur de rétention dans les lésions centrales. Le sphincter interne est lui le principal responsable dans les lésions périphériques. L'étude cinéradiographique de la miction éclaire le mécanisme mictionnel de certaines lésions dites 'mixtes' et doit être répétée après les interventions sur les sphincters. L'examen doit être aussi court que possible afin d'éviter les dangers d'irradiation.

ZUSAMMENFASSUNG

Wir glauben, dass die Untersuchung der vesico-sphinkterischen Aktivität in allen Fällen notwendig ist und dass, mindestens zur Zeit, Cineradiologie eine unschätzbare Untersuchungsmethode in Gemeinschaft mit anderen klassischen radiologischen Methoden darstellt.

CONCLUSION

We think the dynamic study of the vesico-sphincteric activity is a necessity in all cases and, that at least for the time being, cineradiology is an invaluable method of investigation in association with other classical radiological methods.

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Discussion

DR. J. J. WALSH (G.B.). First of all, I thoroughly enjoyed seeing the film of Dr. Paul Dollfus. I don't think I've ever seen a film that was more beautifully done or I think more useful from the physiology and the physiopathology of a problem we have to deal with all the time. I was interested in two things; one is the value to him of the TUR., the internal sphincterotomy, in the low lesions, and I was glad to hear that he is thinking of an external sphincterotomy for his T2 lesion. Several years ago Mr. Cosbie Ross wrote a paper which laid down certain principles and, more than that, certain practical approaches to these problems. For a long time here, and in other places, some of us were frightened to do this. In the last two years, I have been doing it, and I can only thank Mr. Cosbie Ross for laying down such a very clear method of treatment for this difficult problem. Naturally, we wanted to improve on this, if we could, and I thought we would have a short cut, and in two or three cases I did an external sphincterotomy first. Somehow, it didn't work, except in one case, and I have now fallen back on Mr. Cosbie Ross's recommendations; we do a TUR.; if it doesn't work we do an external sphincterotomy. But again, I would like to congratulate Paul Dollfus on a really wonderful film.

MR. COSBIE ROSS. I would like to say how much I enjoyed the film, and clearly these films are not always a success but this one really showed the whole process of micturition in a very brilliant way. I am very interested to hear Dr. Dollfus also say that he has found that, when an obstructive lesion is found, it is not at the internal sphincter level, but it is lower down. This is part of the growing evidence that there is now from the States, and Mr. Walsh has just confirmed it here, for something which we have been saying since 1956 at Southport that the level of the obstruction is nearly always at the external sphincter level and not at the bladder neck. And, I understand

from earlier on from talking to Dr. Dollfus that Dr. Maury has also been carrying out this operation, and has carried out 30 cases, and I would be most interested to hear his results. I might say, just finally, that this is not a dangerous operation—it can be practically bloodless provided it is done by alternating the coagulation and the diathermy-cutting Collins knife. And, also, it doesn't lead to dribbling incontinence—there are a number of other factors causing incontinence; we haven't got time to go into them at the moment, but it does lead to some stress incontinence and to an expressible bladder.

PROFESSOR ASCOLI (*Italy*). May I say something about the paper of Dr. Dollfus. In my opinion the importance of that paper is to have demonstrated the importance of radiological examination of all these urethrae. Because there are different kinds of cases; there are cases where the main importance is the pathology of the vesical neck, others where the external sphincter is responsible and still others where both are responsible, and where there is a synchrony between the two. Naturally, the best is to perform a film, but even if you cannot do it, even with a simple cystography, micturition cystography, you can have good evidence to judge if the responsible organ is the vesical neck or the sphincter. Only in a case where you can demonstrate that the vesical neck is contracted and narrow, is resection of the vesical neck indicated. Not always instinctively, like somebody does; for instance the well-known and celebrated Emmett always says you must make a resection of the vesical neck; it is not true. I have demonstrated some years ago here that in most cases of paraplegia the vesical neck is dilated, very much dilated, and in those cases there was no sense in making a resection and in those cases you must act only on the external sphincter. In conclusion, in all cases in choosing a plan of action you must first radiologically study the case and according to the results of the case you must choose your therapy.

DR. J. SILVER (*G.B.*). There are certain points in Professor Ascoli's paper I think of interest for discussion. The first one was he made the point that with insertion of the catheter into the bladder the blood pressure immediately comes down. I think in the majority of cases it does, but if there is severe infection of the bladder wall I have seen several cases where the blood pressure seems to remain up for several hours, maybe several days, subsequently, and only comes down very gradually. I am engaged to find out whether you can get permanent elevation of the blood pressure from vesical overdistension and I would like to know other people's views on this. I am sure Professor Ascoli knows that you can get this syndrome from distension of the bowel and the uterus as well; it is not just the bladder. A further point is that it is a dangerous phenomena. And the third point is this question of continuous drainage of the bladder as opposed to intermittent catheterisation. I entirely concur with Sir Ludwig Guttmann's views that the bladder should be distended periodically, but many of us have practised at Southport to leave a catheter in until it was decided to discontinue it. In many of these cases, after the discontinuation of the catheter, surprisingly enough, the bladder has remained distensible, and the patient within 24 or 48 hours has a natural bladder. And Dr. Talbot made the point that when he gets his cases late in America, he does an I.V.P. and then takes the catheter out to see how they get on, and I think in 50 per cent. or 60 per cent. of these cases the bladder can contract, though I am quite sure that if there is severe infection—and this is the key to it—plus failure to distend, it can lead to all these distressing complications.

DR. H. TALBOT. Just to make a point there, regarding Dr. Silver's reference to my experience. I can't do that if they're too late. I'll do that within the first 6 months and if there has not been infection. I find, after 6 months, experience has shown that it's almost a futile enterprise, but within 6 months I've found it quite worth while to take the catheter out after the preliminary investigation of renal function and so on and give them a chance, and in a gratifying number of cases the bladder will take up. I think that much depends on whether the bladder wall has ever seriously been altered by infection.

DR. P. DOLLFUS (*France*). What induced us to do ciné-radiography of the sphincters and the bladder is that we had so many sterile urine cases. All our cases are treated

when in the acute phase with intermittent catheterisation and when the acute phase ceases, after 12 weeks, 83 per cent. have sterile urine. And now people leaving us, of about between 92 per cent. and 93 per cent have sterile urine, which is being described in a thesis by Jacob of our centre. We had to find a way of examining the sphincter system of the bladder and we didn't dare to put in a catheter because we knew it was going to infect the bladder, and so this induced us to do ciné-radiography and we think it is a good method.

HETEROTOPIC OSSIFICATION AND THE SURGICAL TREATMENT OF SERIOUS CONTRACTURES

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THE first publication concerning heterotopic ossification, dating from 1918, originates from Déjerine and Ceillier (1918). They found 48·7 per cent. abnormal ossification in cases of paraplegia. This percentage probably includes different forms of pathological ossification apart from true heterotopic ossification. The classifications of heterotopic ossification as reported in the literature are:

- Peri-articular bone-formation;
- Para-osteo-arthropathia;
- Neurogenic ossifying fibromyopathy;
- Heterotopic ossification;
- Osteosis neurotica (para-articularis) (para-ossalis);
- Myositis ossificans circumscripta neurotica.

Writing about heterotopic ossification Damanski (1961) not only deals with true heterotopic ossification, but he includes ossification in cases of decubitus and septic arthritis and accordingly reaches high percentages, while all the patients described suffered from decubitus. He records 162 cases of traumatic paraplegia and 103 cases of other affections of the spinal cord covering a period of twelve and a half years. There were 47 patients with pathological ossification in the group of traumatic paraplegia cases and 25 in the group of non-traumatic paraplegia cases. He noticed a decreasing percentage in the course of the years, which may be due to a better treatment of decubitus. Describing heterotopic ossification we should differentiate between various forms:

1. Septic arthritis, often resulting in widespread ossification including all weak tissues and following the course of local infection and necrosis, intra-articular as well (Hardy & Dickson, 1963).

2. In the case of decubitus ulcerations we often notice sclerotic bone without lamellae, Haversian systems or bone-marrow. This kind of bone formation is mainly found round the trochanters and tubera ossis ischii.

3. Myositis ossificans. This is a properly defined calcification and ossification, chiefly in muscle haematomas or injured tissue.

4. Peri-articular bone formation or true heterotopic ossification. This is found in the case of injury of the central nervous system, especially with frontal