THE RESULTS OF DECAPSULATION IN NEPHRITIS

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Since the publication of Harrison's[1] first three cases in 1896, and of Edebohls' paper[2] in 1904, the operation of renal decapsulation as a therapeutic measure in nephritis has undergone an extensive trial. Among others Horder[3] (4 cases), Tyson[4] (3 cases), Koplik[5] (5 cases), Kidd[6] (4 cases), Boyd[7] (2 cases), J. S. Fowler[8] (3 cases), J. W. Simpson[9] (4 cases), and J. Fawcett[10] (2 cases) have reported favourably on the results of the operation in selected cases.

The early operations were carried out in cases of acute nephritis, but further experience seemed to show that favourable results were more likely to be obtained in subacute conditions, in which œdema was a marked feature. Rovsing[11], in a record of a large series of operations over a period of thirteen years, found on the whole very favourable results in that type of case called the diffuse parenchymatous.

In spite of the successes claimed for it the operation in more recent years has been falling into disfavour. T. G. Moorhead[12] in 1928 expressed the view that the operation is uncalled for, and J. C. Spence[13] makes the statement that decapsulation has fallen into disrepute in the light of the newer knowledge of the disease.

The series reported in this paper consists of twenty-three cases treated in the medical and surgical wards of the Royal Hospital for Sick Children, Glasgow, from June, 1917, to January, 1929. Operation was decided on in each case because of the failure to respond to medical treatment. The persistence of œdema was an important factor in the determination of surgical procedure. All the cases would, therefore, come under the clinical heading of subacute nephritis of parenchymatous or mixed type. In a certain number of the cases a piece of kidney tissue was excised at the time of the operation for histological purposes. It was hoped in this way to gain an insight into the correlation between kidney changes and symptoms.

In Table 1 are presented the clinical and biochemical findings from the records. Of the 23 cases, 7 had died. An endeavour was made during 1929 to have all the survivors return for examination. Two cases (No. 3 and 19) had been lost sight of since their dismissal from hospital. Three others (No. 6, 9 and 15) could not be traced but as they had been seen $1\frac{1}{2}$, $1\frac{2}{3}$, and 2 years respectively after their dismissal, the records then made were used in the analysis. The eleven remaining cases were subjected to a clinical examination and where possible to urea-concentration and pigment-excretion tests,

TABLE

SUMMARY OF 23 CASES OF

Case No.	Before operation						
	Blood pressure	Urine		U.C.T. 2nd hr.	Pigment	Blood urea mgrm. %	Duration of illness
		Bl.	Alb.				
1	115/85	+	+++				19½ weeks
2	110/70	+	++				17 ,,
3	110/68	—	+++		44%		22 ,,
4		—	+++		14%		12½ ,,
5	100/65	±	+++	1·8%	48—64%		19 ,,
6		±	++				11½ ,,
7	100/80	—	+++	2·6%	63%	30	15 months
8	128/100	—	±	2·3%	20%	27	24 weeks
9		+	++				28 ,,
10	90/60	—	++	3%	46%		22 ,,
11	95/70	—	+++				15 months
12	104/68	—	++	1·4%	58%	27·9	29½ weeks
13		—	+++	1·5%	19%		20 ,,
14	110/80	—	++	2%	45%		19 ,,
15	118/80	+	+++	2·3%	47%		18 ,,
16	80/56	—	++	3·4%	18·8%		9½ ,,
17	95/70	—	+++	2·6%	35%		16 ,,
18	106/50	—	++	2·4%	25%		7½ months
19	88/50	±	++				17 ,,
20	118/80	++	+++		34%		10 weeks
21	90/60	+	+++	3%	56%		7½ months
22	112/85	—	+++	2·4%	36%	N.P.N. 70	11 weeks
23	110/90	—	+++	0·8%		N.P.N. 66	21 ,,

1.

DECAPSULATION FOR NEPHRITIS.

After operation			Summary of pathologist's report	Report
U.C.T. 2nd hr.	Pigment	Blood urea mgrm. %		
				Died of nephritis.
				Died.
			Ac. catarrhal nephritis.	Not traced.
				Died following operation.
3·5%	44—56%			Complete recovery.
				Seen May, 1925: perfectly well.
2·7%	62%		Mixed nephritis.	Complete recovery.
2·8%	60%		,, ,,	Died of nephritis.
			Interstitial nephritis.	Seen 1¾ yrs. after dism. Greatly improved; trace of albumin.
			Glomerulo-tubular nephritis.	Died 12 days after operation.
			Mixed nephritis chiefly glomerular.	Now in Eastpark Home. Evidence of chronic interstitial changes.
3%	58%	28·3	Mixed nephritis. Chiefly tubular and interstitial.	Now in Eastpark Home. Seems almost cured.
			Glomerulo-tubular nephritis.	Complete recovery.
2·2%	50%		,, ,,	Complete recovery.
			,, ,,	Seen Jan. 1928. Well but trace of albumin.
2·5%	18%		Subacute parenchymatous nephritis.	Complete recovery.
			Glomerulo-tubular nephritis.	Died of nephritis.
2%	33%		Glomerular nephritis becoming chronic.	Now chronic interstitial nephritis.
	52%		Mixed nephritis.	Not traced.
2·9%	86%		Acute glomerular nephritis.	Still œdema and albuminuria present.
1·8%	30%		Glomerular mixed nephritis.	Slowly improving. Still alb. and occasional œdema.
2·7%	56%	N.P.N. 92	Mixed nephritis, mostly interstitial.	Seems completely free from signs of disease.
			Mixed nephritis.	Died of pneumonia.

together with an estimation of the blood non-protein nitrogen. The urea-concentration test was carried out by the Maclean hypobromite method, the pigment excretion test by the intramuscular injection of 6 mgrm. of phenol-sulphonephthalein and the colorimetric estimation of the 2-hours excretion in the urine: the blood non-protein nitrogen was estimated by the Folin-Wu method. The results are detailed in Table 2.

TABLE 2.

SUMMARY OF 10 CASES OF APPARENT COMPLETE RECOVERY FOLLOWING DECAPSULATION.

Case No.	Years since operation	Blood pressure	Urine			Kidney function tests		Blood N.P.N.
			Blood	Alb.	Casts	U.C.T.	Pigment	
5.	$6\frac{2}{3}$	119/70	—	—	—	1·8%	66%	25 mgrm. %
7.	6	106/66	—	—	—	2·5%	77%	45 ,,
11.	$2\frac{1}{4}$	132/88	—	++	—	1·2%	25%	—
12.	$3\frac{1}{4}$	120/60	—	+	—	2·5%	77%	48 ,,
13.	3	104/60	—	—	—	—	—	—
14.	$2\frac{10}{12}$	110/75	—	—	—	2·2%	64·5%	44 ,,
16.	$2\frac{11}{12}$	100/66	—	—	—	3%	58%	47 ,,
18.	$2\frac{11}{12}$	158/100	—	++	+	1%	8%	86 ,,
20.	$1\frac{7}{12}$	124/80	—	++	±	2·4%	61%	—
21.	$1\frac{4}{12}$	90/62	—	+	±	—	—	—
22.	$\frac{6}{12}$	100/56	—	—	—	1·9%	60%	30 ,,

An analysis of Tables 1 and 2 as to the ultimate result of the operation yields the following figures:—

Cases operated on	23
Result unknown in	2
Apparent complete recovery in	10
Condition had become chronic in	4
Died	7

Causes of death in 7 fatal cases:—

Failing to recover from operation	3
Dying from nephritis	3
Dying from cause not specified	1

An attempt to evaluate the significance of this recovery rate leads to a consideration of the prognosis in general of nephritis in childhood. It is commonly held that acute nephritis in a child usually clears within a reasonable time and the experience in this hospital bears out this opinion. In a series of twenty-five consecutive cases of acute nephritis observed over a period of one year, twenty were dismissed as completely recovered, two died (one from tonsillitis and one after decapsulation), and three are still receiving treatment. When the acute stage passes into the subacute, or when the attack commences as the latter, the outlook is more serious. Evidence of well-marked interstitial change in the kidney substance is also of unfavourable import, at any rate as far as complete recovery is concerned. The two factors, therefore, which specially influence prognosis are the duration of the disease and the extent of

the interstitial damage. These, however, are not directly related. A patient may suffer from subacute nephritis for a relatively long time, months or even years, without showing evidence of interstitial change. It can also be stated that the presence or absence of œdema does not necessarily determine the type of case. While the œdema may be the principal feature of the illness with no evidence of loss of kidney function, it may be accompanied by all the phenomena of impaired renal efficiency (retention of nitrogenous waste-products, high blood-pressure, etc.). An example of the difficulty of classification is given by Case 22. The diagnosis made was one of subacute parenchymatous nephritis which was supported by the high cholesterol content of the blood and the fair result of the urea-concentration test. On the other hand the increase in the blood non-protein nitrogen together with the slight but definite rise in the blood-pressure, suggested glomerular or interstitial change. This hypothesis was confirmed by the histological examination of a portion of excised kidney tissue which showed a mixed nephritis, chiefly interstitial. Despite these findings, clinical and biochemical investigations six months after the operation of decapsulation indicated complete recovery.

TABLE 3.

SUMMARY OF 3 CONTROL CASES NOT TREATED BY DECAPSULATION.

	Hospital records						Latest findings							
Case No.	Blood pressure	Urine			Biochemical		Time since hospital treatment	Blood pressure	Urine			Biochemical		
		Bl.	Alb.	Casts	U.C.T.	Pigment			Bl.	Alb.	Casts	U.C.T.	Pigment	N.P.N.
24	110/70	+	++	+	3·3%	47%	6½ yrs.	138/80	—	±	—	2·7%	37%	46 mgrm. %
25	95/50	—	+++	±	2·4%	51%	5½ yrs.	115/50	—	—	—	2·7%	62%	57 mgrm. %
26	100/80	—	++	+	1·6%	30%	3¾ yrs.	119/60	—	—	±	2·2%	67%	28 mgrm. %

The obvious way, of course, to evaluate the results obtained from decapsulation would have been to compare them with those in a similar series of cases treated medically. Such a proceeding, however, was found impracticable. The one constant feature in the series was failure to respond to medical treatment. Most of such cases had been treated surgically during the period under consideration, and it was only found possible to obtain three non-surgical patients for re-examination. It is clear that this number is quite inadequate for comparison of recovery rates. The clinical and biochemical findings in these cases are, however, of interest (Table 3). In each of these three cases recovery from nephritis seems to have been complete. Case 24 (non-operated) has many points of similarity to Case 12 of the operated series. In each œdema and albuminuria were the prominent features during a long stay in hospital, with a recurrence of symptoms some time after dismissal. Apart from an occasional faint trace of albuminuria both now seem to be well. Case 24 has a slightly raised systolic blood-pressure, which, however, seems to

be of little significance in the presence of the favourable result of the urea-concentration test. The histories of Cases 25 (non-operated) and 7 (operated) have also many features in common, and recovery in each seems to have been complete apart from a slightly raised value for the blood non-protein nitrogen. Case 26 (non-operated) seems also to have recovered from nephritis. A consideration of these three cases, with histories very similar to those detailed in the surgically treated series, would lead to the conclusion that the course and ultimate result in an operated case may be very similar to those in a non-operated case. Further, it would seem to preclude attributing the recovery to the surgical treatment.

It might be thought that any benefit accruing from the operation would be represented in an improvement in the results of renal efficiency tests. The data at hand are inconclusive. Thus, Cases 5 and 12 both show improved results from the urea-concentration test following the operation, while Cases 16 and 21 gave poorer results post-operatively, although all four cases are either better or recovering at present.

TABLE 4.

SUMMARY OF 6 CASES SHOWING IMPROVEMENT IN ŒDEMA AFTER DECAPSULATION.

Case	Duration before op.	Blood pressure	Œdema	Urine			Biochemical tests		Pathological classification
				Bl.	Alb.	Casts	U.C.T.	Pigment	
11	15 months	95/70	++	—	+++	—			Mixed nephritis, chiefly glomerular.
12	7 ,,	104/68	++	—	++	—	1·4%	58%	Mixed nephritis, chiefly tubular and interstitial.
14	4½ ,,	110/80	++	—	+++	+	2%	45%	Glomerulo-tubular with interstitial changes.
15	4⅓ ,,	118/80	++	+	+++	+	2·3%	47%	Glomerulo-tubular nephritis.
19	17 ,,	88/50	++	±	++	+			Mixed nephritis.
22	2½ ,,	112/85	++	—	++	+	2·4%	36%	Mixed nephritis, mostly interstitial.

The histological examination of the renal tissue removed at the operation has been of no help in diagnosis. In only one case (No. 16) was the histological picture one of parenchymatous nephritis: in the others all three kidney structures, glomeruli, tubules, and interstitial tissue, were found to be involved. The course of the disease seems to have been determined more by the severity of the damage than by the particular kidney element chiefly involved. Thus, there appears to be no correlation between the principal site of the lesion in the kidneys and either the clinical picture or the course of the disease following decapsulation.

The condition chiefly affected by the operation was the œdema. In six of the case histories the definite statement is made that the œdema had disappeared or become markedly less within a few days of the operation (Table 4),

Each of these children had been under medical treatment for periods varying from 2½ to 17 months without any material change. The improvement noted was not permanent in every case. Case 11 has since shown signs of chronic interstitial nephritis and Case 12 had a recurrence of all his symptoms after his dismissal from hospital. These results support the view which is at present held, that decapsulation leads, not to a cure of nephritis, but to an improvement of the prominent symptoms (œdema, etc.), most probably by acting in a purely mechanical fashion through allowing of the escape of fluid by the operation wounds. The pathogenesis of œdema is still unsettled although recent work strongly favours the view that it is not due to a defective excretion of salt and water by damaged kidneys, but is the result of a disturbance in the extra-renal tissues. It is thus difficult to see why an operation on the kidneys should result in an improvement. Fleisher and Loeb[14] when writing of operation on the kidney state that the effects of operation do not depend on interference with renal function but on the effect of the operation as such. They maintain that every operation has a profound influence on the exchange of substances between blood and tissues. It is possible, therefore, that a simple laparotomy might be equally efficacious in hastening the disappearance of the œdema.

An attempt was made to determine a common factor or factors by which cases likely to benefit from operation could be recognized. The data even in the small number of cases recorded are, however, sufficiently diverse to show that they are useless in forecasting the value of operation. Of the four cases in which efficiency tests were carried out before operation, Case 12 showed a poor result in the urea-concentration test but a moderately normal pigment excretion; Case 14 gave indication of some degree of renal damage; and Cases 15 and 22 gave normal results with the urea-concentration, but in Case 22 a poor pigment excretion. The blood non-protein nitrogen was normal in Case 12 but markedly increased in Case 22. An examination of the records of the cases showing improvement following decapsulation fails to yield any information of value in determining the particular case likely to benefit by decapsulation.

Summary and Conclusions.

This study is based on an analysis of 23 cases of subacute nephritis in children where decapsulation of the kidneys had been performed because of failure to respond to medical measures. Of these 23 cases 12 have either completely or in very great part recovered. It is possible, however, to obtain very similar results in operated and non-operated cases. Examination of the records fails to reveal any common factor which might be of assistance in the recognition of a case suitable for operation.

The following conclusions seem justified:—

1. From an analysis of the data here recorded it cannot be concluded that the ultimate result in a case of subacute nephritis is influenced by the operation of decapsulation.

2. Certain cases do show definite improvement after operation, this improvement being reflected principally in disappearance of œdema.

3. There is no evidence that improvement in kidney function follows as a result of the operation.

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