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HYPERTENSION WITH STENOSIS OF THE RENAL ARTERY

In a previous issue of the *Journal*[1] we pointed out that the condition of narrowing of the renal artery has been added to the short list of curable hypertensive conditions. We also stated that 'although this condition is seen only rarely at present, it is possible that finer chemical and X-ray investigations might in due course lead to the diagnosis of more cases of this nature'.

An investigation of stenosis of the renal artery as a cause of hypertension has now been reported in the *British Medical Journal* by Brown, Owen, Peart, Robertson, and Sutton,[2] of St. Mary's Hospital, London. It is based on the study of twenty-two hypertensive patients in whom disease of the renal artery was proved or strongly suspected. Eleven of them were judged to be likely to benefit from operation. A routine examination by renal arteriography was made in a hundred and sixty cases of severe hypertension and a lesion of the renal artery was demonstrated in ten of them. In eight of the other twelve cases in the series of twenty-two, the narrowing of the renal artery was revealed at aortography performed for other reasons (usually disease of the aorta or iliacs). It is evident that renal-artery stenosis is not so rare a condition as has hitherto been supposed; it is being recognized in patients with high blood pressure with increasing frequency. The report also records highly favourable operative results in the cure of selected cases of hypertension caused by narrowing of the renal artery.

A wide variety of disorders may lead to this narrowing, but the most frequent cause is an atheromatous plaque, usually near the origin of the artery; and stenosis of the renal artery is to be suspected particularly in those hypertensive patients who have shown evidence of occlusive arterial disease elsewhere (e.g. intermittent claudication and coronary or cerebral arterial occlusion). However, hypertension with stenosis of the renal artery may occur without evidence of these other conditions, nor are these conditions rare in cases of hypertension without demonstrable renal-artery stenosis.

Cases of hypertension caused by stenosis of the renal artery show the usual signs of high blood pressure on clinical examination, but the only characteristic physical sign of the stenosis (not, however, present in every case) is a systolic bruit best heard near the mid-line of the abdomen, but occasionally confined to the costovertebral angle. In their twenty-two cases Brown *et al.*[2] record the murmur as present in ten. In every case operated the origin of the bruit in the renal artery was confirmed by direct auscultation of the artery; in some a thrill could be felt in the affected vessel. The murmur is usually abolished when the patency of the renal artery is restored.

The diagnosis of stenosis of the renal artery depends mainly on renal arteriography and ureteric catheterization studies. Arteriography is of great value in detecting the stenosis, but as it sometimes produces misleading appearances, and as a degree of stenosis may exist without serious effect on the kidney, the diagnosis should be confirmed by 'separate' renal-function studies. These were carried out in every case in the series recorded by Brown *et al.*[2] Intravenous pyelography, also, is often a valuable diagnostic test. All these procedures have their hazards and impose and ordeal on the patient. As Brown *et al.* state, none of them is to be undertaken lightly or by the inexperienced.

Three different techniques are available for renal arteriography, and each of these was used by Brown *et al.*[2] in different cases. They are (1) simple translumbar aortography, (2) aortography by percutaneous transfemoral catheterization by Seldinger's method,[3] and (3) pereutaneus selective renal aortography (Ödman[4]) in which a radiopaque catheter is used. The choice of technique is largely a matter of personal preference.[2] Brown *et al.* favour a modification of Ödman's method devised by D. Sutton, by which excellent renal radiograms were regularly achieved.[2] In one of their cases a stenosis of the renal artery was diagnosed on the aortogram and further investigation showed that no such stenosis existed. 'In several cases . . . where a small artery was virtually occluded no such appearance was produced'.[2] Denny and Tinker,[6] of Johannesburg, found Seldinger's method most satisfactory.

The ureteric-catheterization studies described by these *et al.*[2] were carried out under spinal anaesthesia. Olivary-tipped ureteric catheters were passed *via* a cystoscope under X-ray control so that the tips lay in the respective renal pelves. A self-retaining catheter was left in the bladder so that any leak around the ureteric catheters should immediately become apparent, in which event they were adjusted to stop the leak or reduce it to a minimum; only in this way, the authors state, can accurate measurements of urine flow and clearances be made. This technique also avoids error arising from the movement of water and electrolytes across the walls of the ureter and bladder. After two satisfactory periods of urine collection during which the water load was maintained by oral replacement, 0·9 % sodium chloride containing inulin and sodium para-amino-hippurate (PAH) was infused at a constant rate into an arm vein and further periods of urine collection taken, after equilibration. (In some cases clearance of endogenous creatinine was measured instead of inulin clearance.) 'Apart from occasional discomfort to the patient, the procedure has been free from complications'.[2]

'The characteristic features of renal-artery stenosis . . . are, on the side with the lesion, diminished urine flow; lowered clearance of inulin, creatinine, and PAH; increased urinary concentrations of inulin, creatinine, and PAH; and usually, diminished urinary concentrations of sodium and chloride'.[2] These features derive from the fact that in the affected kidney there is a smaller volume of glomerular filtrate and greater reabsorption of water, sodium, and chloride, than in the opposite kidney. Brown *et al.*[2] record the results of their ureteric-catheterization studies in twelve proved or probable cases of renal-artery stenosis and nine controls. 'In all the probable and proved

cases the affected kidney produced less urine, with a higher concentration of PAH, inulin, and creatinine, and almost invariably a lower concentration of sodium and chloride, than its fellow. This pattern was never seen in the control group, where, if one kidney secreted less urine with a lower concentration of sodium than the other, a lower concentration of inulin and PAH was also found on that side'.[2]

As regards intravenous pyelography, the dyes used in excretion urography (sodium acetrizoate and diatrizoate) produce concentrations in the urine on the two sides which parallel inulin and creatinine concentrations. It was to be anticipated, therefore, that, provided the kidney had not been severely damaged, higher contrast and better visualization would be obtained on the side affected by renal-artery stenosis than on the normal side. In the series of twenty-two cases, better contrast on the side with stenosis was in fact found in seven. The authors[2] give a warning against a wrong impression that might be caused by this finding, viz. that the kidney with the normal artery is functionally impaired; 'there is a very real danger in these cases of the unaffected kidney being removed, with disastrous consequences'.[2] Failure to appreciate the meaning of this frequent result has led to a tendency to overstress the limitations of selective intravenous pyelography. It is often in fact, 'a most valuable diagnostic aid in renal-artery stenosis'.[2]

The surgical procedures that have been used to rectify stenosis of the renal artery include the following: thromboendarterectomy of the renal artery; anastomosis of the splenic artery to the distal renal artery (on the left side); reimplantation of the renal artery in a new site in the aorta; excision of the stenosis in cases where its situation in the renal artery enables this to be done, followed by end-to-end anastomosis; insertion of a bypass graft from the aorta to the distal renal artery; in cases of complete occlusion of the renal artery, as well as certain other cases, nephrectomy is the operation of choice.

In six of the cases in the series reported by Brown *et al.*,[2] which were submitted to nephrectomy or reconstructive surgery, the diagnosis of renal-artery stenosis 'was established beyond reasonable doubt'. In all six the hypertension was of a severe order, and in five of them the optic fundi showed bilateral exudate and haemorrhage (three showed papilloedema also). In these five the blood pressure became normal after the operation and the retinal abnormalities resolved, the heart became smaller, and the ECG signs of left ventricular strain disappeared. In the sixth case the hypertension was not cured. Three earlier cases in the series were operated on after less adequate investigation, and so the diagnosis was less surely established; in only one of these was the operation followed by remission of the blood pressure.

During operations for renal-artery stenosis it is important to measure the pressure in the renal artery distal to the stenosis by direct arterial puncture; 'unless a distinct pressure-drop across the site of the supposed obstruction is found, the diagnosis of a truly functional renal-artery stenosis should be strongly queried, whatever the arteriography appearances suggest'.[2] DeCamp and Birchall[5] hold that if there is no pressure-drop, renal-artery surgery should not be performed, but Brown *et al.*[2] consider that such cases merit further study. At the completion of a reconstructive operation the pressure in the renal artery distal to the site of the previous obstruction should also be measured; the operation can only be regarded as successful if this pressure has been restored to the level of the adjacent aortic pressure.[2]

In cases in which operation for stenosis of the renal artery is not considered to be indicated or has been unsuccessful, hypotensive drugs have been used with varying degrees of success.

1. Editorial (1960): S.Afr. Med. J., **34**, 110.
2. Brown, J. J., Owen, K., Peart, W. S., Robertson, J. I. S. and Sutton, D. (1960): Brit. Med. J., **2**, 327.
3. Seldinger, S. I. (1953): Acta radiol. (Stockh.), **39**, 368.
4. Odman, P. (1956): *Ibid.*, **45**, 1.
5. DeCamp, P. T. and Birchall, R. (1958): Surgery, **43**, 134.
6. Denny, M. B. M. and Tinker, A. J. (1960): S. Afr. Med. J., **34**, 852.

DIE BEHANDELING VAN DREIGENDE EN GEWOONTEMISKRAAM

Na 'n bepaling van die betekenis van die geskiedenis, simptome, en tekens van die pasiënt, en na skatting van hoe onvermydelik die proses van dreigende miskraam is (en hier mag die graad van servikale verwyding deurslaggewend wees), moet oor 'n program van behandeling besluit word. Stalworthy[1] sê: Die vier grondliggende beginsels by die hantering van miskraam is:

1. By elke miskraam is die behandeling onmiddellikspesifiek, *en* algemeen. Sodra die toestand suksesvol behandel is, moet pogings aangewend word om uit te vind waarom dit voorgekom het en planne moet beraam word om 'n herhaling te voorkom.

2. Wanneer 'n miskraam dreig, is die doel van behandeling om te voorkom dat dit onvermydelik word.

3. By alle ander gevalle van miskraam is die doel van die behandeling om te sorg dat die uterus leeg is, om bloeding te beheer, en om sepsis te voorkom.

4. Geen pasiënt moet van mediese sorg ontslaan word voordat dit seker is dat haar gesondheid heeltemal herstel het nie. 'n Ondersoek na 'n miskraam is net so belangrik soos 'n ondersoek voor die tyd. Stalworthy waarsku tereg dat chorion-karsinoom op miskraam mag volg.

Ons wil hier net die eerste twee beginsels bespreek. Rus in die bed oor 'n paar dae is raadsaam. Die waarde van 'n lang tydperk van rus in die bed is twyfelagtig en moontlik selfs nie raadsaam nie: trouens die gewone pligte kan binne 'n dag of twee hervat word. Gebruik van kalmeermiddels sal die ongerief van sametrekkings van die uterus verlig en die vrees vir vaginale bloeding verminder. Morfien en petidien is waardevol. Ons is nie bekend met 'n middel wat die sametrekkings van die uterus tot stilstand sal bring nie. Estrogeen en progesteroon word 'n geruime tyd lank al gebruik by die behandeling van hierdie toestand sonder oortuigende statistiese ondersteuning. Dit is nou bewys, nie net dat progesteroon in dosisse gebruik is wat glad te klein is om enige uitwerking te hê nie, maar ook dat genitale of mindere vermanlikingsanomaliteite by klein dogtertjies mag voorkom. Ten slotte kan die embrio alreeds dood wees teen die tyd dat die pasiënt die eerste keer gesien word en die gebruik van steroïdes mag die proses van miskraam verleng en teruggehoue miskraam by pasiënte veroorsaak in wie se gevalle die toestand nie korrek gediagnoseer is nie — iets wat selfs vir die deskundiges moeilik mag wees.

Daar is egter regverdiging vir die gebruik van steroïdes op grond van onlangse werk oor die bepaling van bloedprogesteroon (nie progesteroon in die urine nie, en die ontwikkeling en opkoms van die sterk en effektiewe norprogesteroon tipe van samestellings wat per mond geneem kan word, byvoorbeeld ‚noretidrel' en ‚noretidroon'. Dit is tot nog toe nie aangetoon dat hierdie produkte misvorming van die geslagsdele veroorsaak nie. Behandeling moet lank genoeg duur om die simptome te beheer, en moet opgehef word wanneer hulle opklaar. Behandeling moet natuurlik gestaak word as die beeld een word van onvermydelike of teruggehoue miskraam.

Pasiënte wat onderhewig is aan gewoontemiskraam moet natuurlik baie goed ondersoek word — selfs voor swangerskap. Afwykinge van die geslagsorgane kan dan vasgestel word, byvoorbeeld deur middel van 'n histerosalpingogram en, waar moontlik, reggestel word. Dieselfde geld vir dieettekorte, chroniese siekte, gebrekkige funksionering van die tiroïed, tekortkominge van die bloed, en onverenigbaarheid van die A-B-O bloedgroepe.

'n Belangstellende en simpatieke houding van die kant van die geneesheer is van onberekenbare waarde by die verligting van spanning en angs by hierdie pasiënte. Hierdie faktor behoort altyd 'n prominente plek in te neem by die behandeling van miskraam, aangesien daar nêrens in die hele gebied van mediese praktyk so baie onstabiele en emosioneel-versteurde pasiënte is nie as diegene wie se begeerte om kinders te hê onbevredig moet bly.[2] Dit is ook van belang dat psigiatriese hulp ingeroep moet word in die gevalle waar daar duidelike emosionele moeilikhede bestaan; so ook is die ondersteuning van die pasiënt se eie geneesheer van groot belang in hierdie gevalle.

Ons moet nog op drie verdere belangrike punte wys in verband met die behandeling van dreigende of gewoontemiskraam. Eerstens lyk dit of dit nodig is dat alle pasiënte wat onderhewig is aan vroeë dreigende miskraam, wat nog nie onvermydelik geword het nie, die voordeel behoort te kry van vroeë behandeling met die norprogesteroon tipe van produkte. Die aantal pasiënte by wie dreigende miskraam nog nie onvermydelik geword het nie, kan op hierdie manier gehelp word. Tweedens moet daarop gewys word dat nie alle vroeë bloeding die gevolg is van dreigende miskraam nie, aangesien ongeveer twintig persent van gevalle van swangerskap vroeë bloeding kry as gevolg van oorsake waaroor daar nog gespekuleer word. Derdens, dit is nie vasgestel dat die progesteroon tipe van produkte die fetus benadeel soos die suiwer progesteroonstowwe nie (wat volgens moderne standaarde in elk geval in dosisse gebruik word wat glad te klein is om swangerskap in stand te hou). 'n Mens hoef dus nie onnodig te vrees dat hierdie soort behandeling aanleiding sal gee tot die geboorte van 'n abnormale baba nie.

Laastens, kan die volgende belangrike prognostiese feit genoem word: die gegewens tot ons beskikking dui sterk daarop dat die kanse om 'n misvormde kind te hê nie vermeerder word in swangerskappe wat gekompliseer word deur dreigende miskrame nie, ook is daar nie bewys dat die behandeling van dreigende miskraam die voorkoms van aangebore gebreke verhoog nie.

1. Holland, E. en Bourne, A. (1959): *British Obstetrical Practice*, 2e uitg., p. 373. Londen: William Heinemann.
2. Danforth, D. N. (1959): *Spontaneous Abortion*, pp. 64 - 72. New York: Paul B. Hoeber.