Hypertension in Polycystic Renal Disease

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The high incidence of hypertension in polycystic disease is well recognised, and generally accepted to be about 75 per cent [1-4]. The object of treatment is to prevent or reduce the morbidity and mortality associated with a raised arterial pressure and to prevent a decline in renal function which, it has been claimed, does not occur if the blood pressure is adequately controlled. This is particularly important in a relatively young group of patients with potential for subsequent dialysis and/or transplantation.

We therefore studied a group of 35 patients with polycystic disease of the kidneys who presented at the Chelmsford Hypertension Clinic between 1961 and 1971, with the aim of assessing our ability to control their hypertension, estimating success in reducing the high morbidity and mortality, and seeking indicators that might help predict the outcome of the attempts at controlling their blood pressure.

The study spanned a period of rapid development of potent and effective drugs for controlling hypertension. We made no attempt to relate control of blood pressure to any specific treatment regimen.

Mode of Referral

Ten patients (29 per cent) were found by their general practitioners to be hypertensive and were referred to the clinic. The remainder presented for the following reasons. Twelve patients (34 per cent) had urinary symptoms and/or evidence of infection of the renal tract; 6 patients (17 per cent) had evidence of cardiovascular disease; 7 patients (20 per cent) had disease related directly to the urinary tract, either palpable kidneys (4 patients) or uraemia (3 patients). All had hypertension and all were referred subsequently to the clinic.

All 35 patients maintained a standing diastolic blood pressure, measured with a standard mercury sphygmomanometer, greater than 90 mm Hg on three successive attendances, the diastolic pressure being recorded at phase four.

In order to assess the adequacy of blood pressure control, the patients were divided into arbitrary groups on the basis of the blood pressure control on treatment:

- Good = <90 mm Hg;
- Fair = 91-109 mm Hg;
- Poor = >110 mm Hg.

Results

Age and Duration of Survival

The mean age at presentation was 49.5 years (range 26-79 years). Sixteen patients (45 per cent) died during the period of the survey. The mean age at death was 54.3 years, compared with a mean age of those who survived of 49.3 years. The mean duration of survival was 5.7 years. No sex predominance was found in those who died.

Blood Pressure and Mortality

The mean presenting diastolic pressure was 110.7 mm Hg: 22 patients (63 per cent) presented with diastolic pressures in excess of 110 mm Hg and, of these, 7 (20 per cent) presented with blood pressures in the range 110-119 mm Hg, 8 (23 per cent) presented in the range 120-129 mm Hg, while 7 patients (20 per cent) presented with blood pressures greater than 130 mm Hg. The mean diastolic blood pressure at presentation of those who died was 121 mm Hg, and of those who died in uraemia 112 mm Hg. Of the 25 patients (71 per cent) who presented with diastolic blood pressures above 110 mm Hg, 15 (42 per cent) died during the period of follow-up. By far the highest mortality occurred in the group who presented with diastolic blood pressures greater than 130 mm Hg. Figure 1 and Table 1 show that not only was a high

| Diastolic Blood Pressure (mm Hg) | Good BP Control | Fair BP Control | Poor BP Control |
|---------------------------------|----------------|----------------|----------------|
| 90-99                           | 7              | 3              | 0              |
| 100-109                         | 1              | 1              | 1              |
| 110-119                         | 1              | 4              | 2              |
| 120-129                         | 2              | 5              | 1              |
| >130                            | 0              | 1              | 6              |

diastolic blood pressure at presentation an indicator of poor prognosis, but that subsequent attempts at control were unsuccessful, with a high mortality.
Effect of Renal Function on Blood Pressure Control

Patients were arbitrarily divided into two groups on the basis of their blood urea being greater or less than 60 mg/100 ml at presentation. There was no difference between these two groups (Table 2), blood pressure control being no more difficult to achieve in the uraemic group. Table 3 shows mortality in relation to uraemia and subsequent blood pressure control.

Table 2. Effect of initial renal impairment on subsequent blood pressure control.

| Blood Pressure Control | No. of Patients with: |   |   |
|------------------------|-----------------------|---|---|
|                        | Urea<60mg/100ml       | Urea>60mg/100ml |
| Good                   | 8                     | 3  |
| Fair                   | 10                    | 4  |
| Poor                   | 5                     | 5  |
| Total                  | 23                    | 12 |

Table 3. Relationship of elevated blood urea, subsequent blood pressure control and mortality.

| Control | Polycystics | Polycystics who died | Polycystics who died of ureaemia |
|---------|-------------|----------------------|---------------------------------|
|         | No. | %    | No. | %     | No. | %     |
| Good    | 11  | 31.4 | 2   | 12.5  | 0   | 0     |
| Fair    | 13  | 37.1 | 5   | 31.5  | 4   | 50    |
| Poor    | 11  | 31.4 | 9   | 56.25 | 4   | 50    |

Causes of Morbidity and Mortality

Eight patients (22 per cent) died from uraemia. Blood pressure control was 'fair' in 4 patients, and 'poor' in the remaining four (see Table 3).

Table 4 shows the causes of death, renal failure being the most common cause, with an associated high mortality from cardiovascular disease.

Table 4. Causes of death in polycystic renal disease.

| Cause of Death                  | No. of Patients | %   |
|---------------------------------|-----------------|-----|
| Uraemia                         | 8               | 20  |
| Cerebrovascular accident        | 7               | 20  |
| Myocardial infarction           | 8               | 25  |
| Pneumonia                       | 1               | 6   |
| Other causes (malignant)        | 1               | 6   |
| Total deaths                    | 21              | 60  |

Table 5 illustrates the very high incidence of cardiovascular complications, with 66 per cent of all patients suffering a cardiovascular incident during the course of the survey.

Table 5. Morbidity in polycystic renal disease—cardiovascular complications.

| Cause of Death                  | No. of Patients | %   |
|---------------------------------|-----------------|-----|
| Cerebrovascular accident        | 7               | 20  |
| Myocardial infarction           | 8               | 25  |
| Cardiac failure                 | 6               | 17  |
| Total deaths                    | 21              | 60  |

Discussion

The findings of our series agree with those of others[3,5,6]. Age at presentation and death, together with duration of survival, are all similar. We have confirmed the findings of Beevers et al.[7] that the control of raised arterial pressure is most effective in those who present with the least severe hypertension. The outlook was good for those presenting with diastolic blood pressures between 90-99 mm Hg, only one patient from the group dying during the period of follow-up. The mortality rose rapidly with failure to gain satisfactory control of blood pressure; 66 per cent of the group presenting with a diastolic blood pressure of 130 mm Hg died during the period of follow-up.

The commonest cause of death was uraemia, but many of the patients dying from other causes were uraemic at the time of death. Our data does not allow us to assess the success of preventing a decline in renal function, but a finding of significant renal impairment at the time of presentation is clearly an ominous prognostic sign. In our own group 9 patients who presented with a blood urea greater than 60 mg/100 ml died during the period of follow-up. In 5 of these patients the control of blood pressure was poor, but it was very good (<90 mm Hg) in the other four.
One-third of our patients died from vascular causes. This very high incidence reflects the difficulty in maintaining good blood pressure control. In one-third of our patients the blood pressure control was poor, i.e. >110 mm Hg, despite rigorous attempts at control.

Two-thirds of all patients developed vascular complications, i.e. cerebrovascular accident, myocardial infarction, or heart failure. No difference between the sexes was found in this respect. Such high figures are disappointing because these complications may preclude these patients from taking part in a dialysis/transplantation programme, thus ensuring a continuing high mortality from renal failure.

Conclusion

Polycystic renal disease presents a difficult, daunting and depressing challenge to the physician. Our own attempts at controlling blood pressure were disappointing; we were unsuccessful in our attempts at improving the prognosis in those patients presenting with a high diastolic blood pressure, and we were unable to reduce the high mortality and morbidity associated with this condition.

The obvious and important reason for our lack of success was the failure to gain rapid and effective control of blood pressure. This may have been due in part to poor patient compliance and a failure of the physician to pay enough attention to the diastolic blood pressure at each attendance, but our experiences with a similar group of patients with chronic pyelonephritis and hypertension suggest that the hypertension occurring in polycystic renal disease is more difficult to control.

We would stress the need for meticulous attention to blood pressure control in these patients. They should be followed wherever possible in hypertension clinics, their renal function being carefully and regularly measured, and should be speedily referred to specialist renal units when a decline in renal function becomes apparent.

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A Valuable Gift

In 1868 Robert Cook gave his son, John, of Upper Wimpole Street, a copy of the first edition of Johnson's Dictionary (1755). Three years before John had graduated MD at Edinburgh, and three years later had obtained his MRCP. To his father's inscription on the title-page he added 'This is a valuable gift from a father to a son and as such I value it'. By the turn of the century, and some years before his death (c. 1917), this book was in the College library. Whether John Cook gave it or whether it came through a third party is not known—a change of values perhaps; but by that time publication of the New English Dictionary (or Oxford Dictionary as it has become known) was well under way. The first part appeared in 1884, but it was not completed until 1928, by which time fifty years had elapsed since its original conception. Johnson's Dictionary took rather less.

It was in 1707, two years before Johnson was born, that Humfrey Wanley, librarian to the first and second ears of Oxford, set down a list of 'good books wanted', among them a dictionary for fixing the English language, comparable to the dictionaries compiled by the Italian and French Academies in 1612 and 1694 respectively. After Addison and Pope, among others, had made plans which did not come to fruition, the idea was put to Johnson that a dictionary of the English language would be well received by the public; this in spite of the fact that Nathan Bailey's Universal etymological dictionary (1721) had been very popular. At first Johnson seemed to catch at the proposition, but after a pause he said in his abrupt manner, 'I believe I shall not undertake it'. Although doing nothing about it at the time, the suggestion started a train of thought which seemed more promising and congenial each time he turned his mind to it.

Eventually, when a consortium of publishers headed by Robert Dodds offered him a contract for £1,575, Johnson completed The Plan of a dictionary (1747) which he believed would standardise and illustrate the English language. Although having no training as a lexicographer, Johnson believed that he could finish the work in three years, in spite of the fact that the Italian and French dictionaries had been compiled by bodies of lexicographers working together as academies over decades. When he was reminded of this by Dr Adams of Pembroke, Johnson made a joking reply in which he pretended to calculate how many Frenchmen would be said to equal one Englishman.

While the Dictionary was going forward Johnson lived part of the time in Holborn and part in Gough Square, Fleet Street. He employed six assistants whose job it was to copy down words partly taken from other dictionaries, and partly supplied by himself by unguided 'excursions into books . . . and in the boundless chaos of a living speech'. Spaces were left for Johnson to write in their etymology, definitions and various significations. The authorities were copied from the books themselves in which passages had been marked with a pencil, the traces of which could be easily effaced. Certain books survive (Bacon's Essays, and South's Sermons, for example), with

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