Stopping treatment in patients with hypertension

Malcolm Aylett, Stuart Ketchin

Glendale Surgery, Wooler, Northumberland NE71 6DN

Malcolm Aylett, FRCGP, general practitioner
Stuart Ketchin, MRCGP, general practitioner

Correspondence to: Dr Aylett.

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It is standard teaching that once treatment for hypertension is started it will be necessary for life.^{1,2} It is assumed that patients who stop their drugs will relapse, yet anecdotal evidence suggests that hypertension does not always recur. Records of untreated patients may show a series of previous high blood pressure readings and non-compliant patients remain normotensive. We had observed several such cases, and we decided to try to discontinue antihypertensive drugs in selected patients.

Subjects, methods, and results

Our practice, which comprises 1550 patients, is in a rural area with a low population turnover and an adult age-sex and social class distribution similar to that in the United Kingdom as a whole. We used the British Hypertension Working Party's diagnostic criteria for hypertension³—a diastolic blood pressure (Korotkoff phase V) sustained above 100 mm Hg for three or more readings—to determine whether to start antihypertensive treatment. Twelve per cent of adults aged 40-64 years in our practice were receiving antihypertensive drugs. Patients with no end organ damage and who were taking only one drug and had consistently good control were entered into the trial.

Nine patients entered the trial. Three patients had been treated for more than 10 years, five for four to nine years, and one for two years. Though all measurements were made with the same type of sphygmomanometer and all the readings at diagnosis

were well within our diagnostic criteria, misdiagnosis cannot be ruled out.

During the trial we measured blood pressure using mercury sphygmomanometers with 35 cm cuffs. We both used the same recording protocol and had taken part in the same relevant educational programme. All machines were checked regularly and calibrated at least annually.

All patients were followed up for two years after stopping treatment. One relapsed after two months, but the remaining eight continued to have normal blood pressure (table).

Comment

We found no reports of hypertensive patients stopping treatment in European centres. American workers use different diagnostic criteria and their work is difficult to compare with European standards.

Less than 6% of hypertensive patients are thought to have secondary hypertension.⁴ Obesity is an obvious cause of artefactual hypertension, and high alcohol consumption may account for 10-30% of cases.⁵ Other reversible causes are less well documented, although depression has been suggested to be important.²

Transient stress is a common cause of raised blood pressure, which may persist over several readings. There is no clear dividing line between transient stress and mild agitated depression, and in many patients with reversible hypertension the cause may have been stress. The assumption that hypertension must be treated for life should be questioned. Sustained life stress might be an important factor in some cases.

In 1987 over two million patients were treated for hypertension in the United Kingdom at a cost in drugs alone of £104 million. Stopping the treatment of only a small proportion of patients would save much money and appreciably reduce the workload of general practice and hospitals. Implications for prescribing budgets are obvious. Many patients would be relieved of the necessity of taking drugs and for some the quality of life would be improved. Larger studies of the effect of discontinuing antihypertensive drugs are needed.

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Average blood pressure (mm Hg)* in patients with hypertension at time of diagnosis and before and after stopping treatment

Case No	Sex	Age at diagnosis (years)	At diagnosis		Before stopping treatment		>1 Year after stopping treatment	
			Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
1	M	53	162	106	128	82	144	89
2	F	65	170	107	138	76	173	85
3	F	48	200	110	148	85	163	87
4	F	51	166	118	140	85	134	90
5	F	50	165	106	149	85	152	88
6	F	50	190	119	147	87	150	89
7	F	54	166	109	144	85	149	90
8	M	51	165	103	140	81	151	90
9	M	62	185	106	159	81	194†	104†

*All blood pressure values are means of three readings.

†Readings taken soon after stopping treatment. Drugs were restarted.

Risk of appendicectomy in occupations entailing contact with pigs

Markku Seuri

Department of Community Health and General Practice, University of Kuopio, PO Box 1627, SF-70211 Kuopio, Finland
Markku Seuri, senior lecturer in occupational health and general practice

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Yersinia bacteria are one possible group of micro-organisms which might cause appendicitis.¹ In a recent study *yersinia* infection was found in 31% of patients with acute appendicitis.² Moreover, the most common form of *yersinia* infection—acute intestinal infection—often mimics appendicitis, leading to the removal of an innocent appendix.³

Yersinia spp are common in swine in various parts of

the world, and at least 35% of pigs slaughtered in south western parts of Finland were found to be infected.⁴ Abattoir workers reportedly have an increased risk of *yersinia* infections.⁵ So far as I know work related exposures have never been considered in the context of appendicitis or appendicectomy, and I therefore decided to conduct a postal survey among pig farmers, abattoir workers, and farmers not exposed to pigs, asking if their appendixes had been removed.

Subjects, methods, and results

The study included 172 slaughterhouse floor workers from six pig processing abattoirs in central and northern Finland, 270 pig farmers, and 310 grain or berry farmers who were not involved with meat production and who lived in the eastern part of

Age group (years)	Analysis A*					Analysis B†				
	No of study subjects		Prevalence of appendicectomy among grain or berry farmers (No of cases/No of farmers)	Expected prevalence of appendicectomy among study subjects		Observed prevalence of appendicectomy among study subjects		Standard population (No of grain or berry farmers)	Expected No of appendicectomies among study subjects	
	Abattoir workers	Pig farmers		Abattoir workers	Pig farmers	Abattoir workers	Pig farmers		Abattoir workers	Pig farmers
21-25	7	6	0/2	0	0	1/7	0/6	2	0.29	0
26-30	20	21	0/7	0	0	3/20	1/21	7	1.05	0.33
31-35	24	22	1/14	1.71	1.57	1/24	3/22	14	0.58	1.91
36-40	32	32	0/27	0	0	4/32	2/32	27	3.38	1.69
41-45	29	31	1/27	1.07	1.15	3/29	2/31	27	2.79	1.74
46-50	21	23	1/18	1.17	1.28	2/21	1/23	18	1.71	0.78
51-55	13	22	1/19	0.68	1.16	3/13	3/22	19	4.39	2.59
Total	146	157	4/114	4.63	5.16	17/146	12/157	114	14.19	9.04

*Age standardised risk ratios (observed/expected): abattoir workers 17/4.63=3.67; pig farmers 12/5.16=2.33.
†Number of appendicectomies in standard population=4. Age standardised risk ratios: abattoir workers 14.19/4=3.55; pig farmers 9.04/4=2.26.

Finland. The questionnaire was returned by 163 (95%) abattoir workers, 204 (76%) pig farmers, and 262 (85%) grain or berry farmers.

Subjects who did not answer the questionnaire were excluded from the analysis together with those who were under 21 years of age, those who had had an appendicectomy before the age of 21, and those aged over 55 (only one abattoir worker was over 55). Subjects who kept cows, sheep, horses, or foxes (or other fur coated animals) were excluded. Owning dogs or cats was not a criterion for exclusion because most of the farmers had these animals. After these exclusions 146 abattoir workers (including 14 women (10%)), 157 pig farmers (32 (20%) women), and 114 grain or berry farmers (12 (11%) women) remained for analysis.

Information was not available on the ages of the abattoir workers when they entered the meat industry or of the farmers when they were first employed in farming. But both occupations are fairly stable in this part of Finland, and I therefore analysed the data assuming that all subjects had entered their occupations at the age of 21.

The number of appendicectomies performed on abattoir workers was higher than that performed on farmers. Pig farmers had had more appendicectomies than the grain or berry farmers (table). After standardisation for age the risk ratio for appendicectomy (compared with the grain or berry farmers) was 3.7 (95% confidence interval 2.1 to 5.9) among the abattoir workers and 2.3 (1.2 to 4.1) among the pig farmers.

Only five women had had an appendicectomy—namely, one among the abattoir workers, four among the pig farmers, and none among the grain or berry farmers. The crude risk ratio for men was 3.1 among the abattoir workers and 1.6 among the pig farmers.

Comment

My findings may be biased by the age (21 years) at which the subjects were assumed to have entered the study occupations. For farmers the assumed age of 21 was probably too high as almost all Finnish farmers are born and brought up on farms. The type of employment tends to change as the farmer ages, from the harder work of animal tending to the less strenuous

grain growing. The effect of this change in exposure to diseases associated with animal tending would be a reduction of risk ratios. Some older farmers analysed in this series among the grain farmers might have had a higher risk in their early adulthood when raising cattle.

Conversely, an assumed age of 21 at first employment in an abattoir, might have been too low in many cases. But as before, the effect on the risk ratio would be to decrease rather than increase it as there is hardly any other kind of work in which the risk of appendicectomy might be greater. Furthermore, the increased rate of appendicectomy among abattoir workers was seen in all age groups. Thus, although lack of information on the dates that the subjects entered their occupations is a weakness in my study, its effect is to decrease rather than increase the risk ratio.

The more urban lifestyle of the abattoir workers may have produced another source of bias. Abattoir workers may be more likely to make use of health services and have their appendixes removed because of minor abdominal complaints. The possible difference in health behaviour between abattoir workers and farmers, however, cannot explain the difference observed between the two groups of farmers in this series.

The biological basis of the increased risk of appendicectomy in occupations entailing close contact with pigs might be explained by *Yersinia* spp acting as an occupational zoonotic agent.

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