of a preceding pregnancy had any effect on the outcome of the subsequent pregnancy. A first, second, or third pregnancy was taken as the index pregnancy and the outcome of the subsequent pregnancy examined.

The distribution of social classes in the sample was: class I, 12%; class II, 16%; class III, 48%; class IV, 13%; class V, 4%; and 7% of patients were of unknown social class.

The table shows the outcome of the pregnancy after the index pregnancy. There were 51 malformations after a normal pregnancy (2.4%) and 10 after a spontaneous abortion (2.3%). Nine (18%) of the malformations after a normal pregnancy were of the central nervous system (CNS), as were four (40%) of the malformations after a spontaneous abortion.

Comment

The rate of malformations in the subsequent pregnancies was the same whether these followed a normal pregnancy or a spontaneous abortion. These findings failed to confirm the suggestion of an increased rate of malformations after a spontaneous abortion.¹ The rate of malformations of the CNS, however, was higher after a spontaneous abortion, but some of these aborted fetuses probably also had defects of the CNS. The rate of spontaneous abortions after a previous abortion was increased more than twofold, and it also appeared that there might be an increased rate of abortions after a major malformation, but here the numbers were small.

We conclude that women who have had a spontaneous abortion are not at any overall increased risk of a malformation in their next pregnancy. The chances that the next pregnancy will again end in abortion are increased, and there is probably a very small increased risk (under one in 100) of the fetus having a defect of the CNS.

We thank our colleagues in Liverpool for helpful discussion and encouragement and an anonymous donor for financial support.

Full data of this survey are available from Dr T J David.

¹ Gardiner A, Clarke CA, Cowen J, Finn R, McKendrick OM. Spontaneous abortion and fetal abnormality in subsequent pregnancy. *Br Med J* 1978;ii:1016-8.

² Fedrick J, Adelstein P. Preceding pregnancy loss as an index of risk of stillbirth or neonatal death in the present pregnancy. *Biol Neonate* 1977;31:84-93.

(Accepted 29 November 1979)

Booth Hall Children's Hospital, Blackley, Manchester M9 2AA

T J DAVID, MRCP, DCH, acting consultant paediatrician

Bristol Maternity Hospital, Bristol BS2 8EG

CAROLINE M SMITH, SRN, SRM, in-course training sister

Indomethacin and perforated duodenal ulcer

Cooke¹ found that only 5.5% of 634 patients taking indomethacin had a peptic ulcer, no greater than the general population. A six-year review of perforated duodenal ulcers in Exeter showed that out of 21 perforations in women aged over 60, 8 (38%) were taking indomethacin. A group matched for age and sex were studied to see whether this association was due to a high intake of indomethacin around Exeter.

Patients, methods, and results

The notes of 89 patients admitted to the Royal Devon and Exeter Hospitals between January 1970 and December 1975 with perforated duodenal ulcer were reviewed. Eleven (12%) were taking indomethacin. Eight (38%) of the women aged over 60 in the group were taking indomethacin (table). Nine patients were taking the indomethacin by mouth, one by suppository, and one by both methods. Three patients were also taking either prednisolone 2.5 mg four times a day, corticotrophin 15 mg weekly, or aspirin. Four patients were taking indomethacin for osteoarthritis, five for rheumatoid arthritis, one for gout, and one patient for arthritis of indeterminate type. In contrast to the short preoperative dyspepsia of many of these patients 10 were found at operation to have chronic ulcers. In two cases these involved the liver and surrounding structures.

The notes of 222 women over the age of 60 who were admitted to the same hospitals with gall stones between January 1971 and December 1975

were also reviewed. These patients had a similar distribution according to age as had the patients with a perforated duodenal ulcer. None were recorded as taking indomethacin (table) although 12 were recorded as having arthritis. There was no record of current medication in five patients.

Comment

Non-steroidal anti-inflammatory analgesics are often implicated in the aetiology of peptic ulceration but, apart from aspirin²⁻⁵ and phenylbutazone,⁶ there is little statistical evidence.¹ If the association between indomethacin and perforated duodenal ulcer in Exeter simply reflected a high level of ingestion of the drug about 100 of the 222 women over the age of 60 admitted to the same hospitals with gall stones would have been expected to be taking indomethacin. In fact, none were recorded as taking it. This difference was statistically significant (table). Possibly some of the patients with gall stones were taking indomethacin and this was not recorded. This is unlikely since most of them were routine admissions for cholecystectomy and had in their notes a record of their current medication filled in by their general practitioner. Also only 12 of them were recorded as having arthritis. Even if all these and those whose current medication was not recorded had been taking indomethacin the incidence of indomethacin ingestion would still be significantly less in patients with gall stones (table). One must conclude from these

Incidence of indomethacin ingestion in women aged over 60 presenting with either perforated duodenal ulcer or gall stones

	Patients with perforated duodenal ulcer	Patients with gall stones	Total	Statistical significance
Taking indomethacin	8	—	8	$\chi^2 = 74.22$ $p < 0.001$
Not taking indomethacin	13	217	230	
Total	21	217	238	
Taking indomethacin plus drugs not stated	8	5	13	$\chi^2 = 41.85$ $p < 0.001$
The rest	13	217	230	
Total	21	222	243	
Taking indomethacin plus patients with arthritis	8	17	25	$\chi^2 = 16.10$ $p < 0.001$
The rest	13	205	218	
Total	21	222	243	

figures that indomethacin is a major predisposing factor to perforation in duodenal ulcer, particularly in the elderly.

One patient in this series was also receiving prednisolone and another corticotrophin injections. Possibly in these cases corticosteroids were also predisposing factors. A striking feature of this group of perforations is the discrepancy between the chronicity of the ulcer found at operation and the preoperative symptoms. Large and penetrating ulcers gave rise to very few symptoms. Although many would advocate a conservative surgical approach in treating these patients it is notable that two of the ulcers in this series bled post-operatively, one despite vagotomy and pyloroplasty, and that all except two patients had chronic ulcers.

I thank Messrs H D Moore, M Golby, A J Knox, C Shaldon, and K D Vowles for allowing me to review their cases and Mrs A F Morris for statistical help.

¹ Cooke AR. Drugs and gastric damage. *Drugs* 1976;11:36-44.

² Douglas RA, Johnston ED. Aspirin and chronic gastric ulcer. *Med J Aust* 1961;2:893-7.

³ Duggan JM, Chapman BL. The incidence of aspirin ingestion in patients with peptic ulcer. *Med J Aust* 1970;1:797-800.

⁴ Levy M. Aspirin use in patients with major upper gastrointestinal bleeding and peptic ulcer disease. A report from the Boston Collaborative Drug Surveillance Program, Boston University Medical Center. *N Engl J Med* 1974;290:1158-62.

⁵ Glarborg Jorgenson. Drug consumption before perforation of a peptic ulcer. *Br J Surg* 1977;64:247-9.

(Accepted 20 November 1979)

Royal Devon and Exeter Hospitals, Exeter, Devon

M R THOMPSON, MB, FRCS, senior registrar