

about side effects also contributed to non-use of emergency contraception.

The importance of perceived vulnerability is pivotal to the adoption of behaviour that is protective to health.⁴ A similar process may be occurring with risks of pregnancy. Some of the women believed that they were invulnerable to pregnancy. Personal invulnerability and the tendency to perceive that others are at greater risk of disease than yourself have been well documented in a range of behaviours.⁵ Many women also felt ashamed about what had happened and about needing emergency contraception.

Personal invulnerability to pregnancy or concerns about what other people think were predominantly reported by the younger women or those reporting their views as teenagers. Younger and more disadvantaged women were also more likely to avoid emergency contraception because of associated anxiety and guilt. These women are less able to afford over the counter emergency contraception. Educational interventions targeted at these vulnerable groups should promote the attitudes and personal skills needed to obtain emergency contraception. In addition, interventions could focus on providing emergency contraception in a way

that avoids young people having to ask for it or that improves their use of other forms of contraception. Consultations with healthcare professionals that focus on the risks of unprotected intercourse can deter women from reattending for emergency contraception.

We thank the staff in the hostels for homeless people, youth groups, schools, family planning clinics, and surgeries, the participants, and Connie Smith, codirector of Westside Contraceptive Services, for her comments on the paper.

Contributors: See bmj.com

Funding: Department of Health as part of the national primary care training fellowship.

Competing interests: None declared.

- 1 Trussell J, Stewart F, Guest F, Hatcher RA. Emergency contraception pills: a simple proposal to reduce unintended pregnancies. *Fam Plann Perspect* 1992;24:269-73.
- 2 Anderson C, Bissell P, Sharma S, Sharma R. *The Lambeth, Southwark and Lewisham community pharmacy emergency contraception service*. London: Lambeth, Southwark, and Lewisham Health Action Zone, 2001.
- 3 Harper C, Ellertson C. Knowledge and perception of emergency contraceptive pills among a college-age population: a qualitative approach. *Fam Plann Perspect* 1995;27:149-54.
- 4 Rosenstock I. Historical origins of the health belief model. *Health Educ Monographs* 1974;2:1-8.
- 5 Weinstein N. Why it won't happen to me: perceptions of risk factors and susceptibility. *Health Psychol* 1984;3:431-57.

(Accepted 24 September 2002)

β Blockers for glaucoma and excess risk of airways obstruction: population based cohort study

James F Kirwan, Julia A Nightingale, Catey Bunce, Richard Wormald

Department of
Epidemiology and
International Eye
Health, Institute of
Ophthalmology,
London EC1V 9EL
James F Kirwan
research fellow

Royal Brompton
Hospital, London
SW3 6LY

Julia A Nightingale
specialist registrar

Moorfields Eye
Hospital, London
EC1V 2PD

Catey Bunce
medical statistician
Richard Wormald
senior lecturer

Correspondence to:
J F Kirwan
jfkirwan@ucl.ac.uk

BMJ 2002;325:1396-7

Topical β blockers are the most commonly prescribed drugs in the United Kingdom for glaucoma.¹ They are known to exacerbate bronchospasm in asthma and chronic obstructive pulmonary disease.² This study examined whether topical β blockers are associated with excess respiratory disease in elderly patients not considered to be at excess risk.

Participants, methods, and results

We used the Mediplus database to identify patients with no previous diagnosis of airways obstruction. We defined exposed patients as patients who had used ophthalmic topical β blockers for the first time in the period 1993-7. Unexposed patients were randomly selected (loosely matched by age and sex to exposed patients). For validation we inspected a random sample of 40 full longitudinal records of exposed and unexposed patients.

We defined patients who had excess respiratory disease in two ways. Definition A patients were patients who in the 12 months after treatment with topical β blockers were given for the first time a drug used for the treatment of reversible airways obstruction (β₂ agonists, inhaled corticosteroids, theophyllines, and inhaled anticholinergics). Definition B patients combined definition A patients with patients who in the 12 months after treatment with topical β blockers had a new Read code for asthma or chronic obstructive pulmonary disease entered on their record.

Exposed patients (n=2645) were slightly older than unexposed patients (n=9094) (68.6 versus 67.5 years). Exposed patients were less likely than unexposed patients to smoke and to use systemic β blockers and were slightly more likely to visit their general practitioner (median six versus five visits). In definition A patients we found an adjusted hazard ratio at 12 months after treatment with topical β blockers of 2.29 (95% confidence interval 1.71 to 3.07)—equivalent to a number needed to harm of 55 patients (table).

Of the 3358 patients (including patients with previous airways obstruction) begun on a topical β blocker during the study period, 148 (4.4%) had used drugs for airways obstruction within the previous year. Airways obstruction had been identified as an active problem (definition B) within the previous year in 316 subjects (9.4%).

Comment

Topical β blockers for glaucoma or ocular hypertension may lead to new airways obstruction requiring treatment in a population not considered to be at excess risk. This finding raises an issue of public health importance because of the large number (approximately 500 000) of elderly patients in the United Kingdom who are treated for glaucoma and ocular hypertension. Topical β blockers have been shown to affect respiratory function in elderly patients with no previous history of airways obstruction, although a

Risk of developing airways obstruction in patients taking a topical β blocker for glaucoma

Diagnostic criterion	Time point after treatment with β blockers	No (%) of new cases		Unadjusted rate ratio (95% CI)	Adjusted hazard ratio (95% CI)*	No of patients needed to harm (95% CI)†
		Patients given topical β blockers (n=2645)	Control patients (n=9094)			
Definition A‡	At 6 months	49 (1.9)	55 (0.6)	2.83 (1.91 to 4.20)	2.79 (1.88 to 4.15)	84 (51 to 131)
	At 12 months	81 (3.1)	112 (1.2)	2.39 (1.79 to 3.20)	2.29 (1.71 to 3.07)	55 (39 to 85)
Definition B§	At 6 months	115 (4.3)	172 (1.9)	2.16 (1.70 to 2.76)	2.18 (1.71 to 2.79)	42 (30 to 60)
	At 12 months	191 (7.2)	354 (3.9)	1.81 (1.5 to 2.16)	1.77 (1.48 to 2.12)	30 (22 to 42)

*Adjusted analysis used a proportional hazards model, corrected for age, sex, use of systemic β blockers, use of non-steroidal anti-inflammatory drugs, use of nitrates, smoking, season of presentation, and number of visits to general practitioner after index date.

†Number of patients needing to be treated with topical β blockers to cause one case of airways obstruction during that time period.

‡Patients who were given a new prescription of a drug used in the treatment of airways obstruction.

§Definition A patients combined with patients who had a Read code for airways obstruction listed in their record.

small, short term study disputed this.^{3,4} Our data indicate an attributable risk of 1000 patients per year in the United Kingdom, one case every 11 years for a general practitioner. One would expect the effect of β blockade on airways function to be rapid—and indeed the risk ceases to be significant after the first year of exposure. This risk is in patients without previous airways obstruction; patients with pre-existing airways obstruction may well be more sensitive to β blockers.

Our study depends on a diagnosis of airways obstruction having been made. Therefore, allowing for a certain rate of missed diagnosis or misdiagnosis, we may have underestimated the true risk. An inherent weakness of the study is that clinical data could not be thoroughly validated. It is unlikely that objective spirometric evidence was always obtained. But for prescribing information the database is reliable, and a systematic error is unlikely to account for our findings.

Ophthalmologists, general practitioners, physicians, and pharmacists need to be aware of the possibility of iatrogenic airways obstruction in patients taking topical β blockers for glaucoma. When eyesight cannot be threatened within their expected lifetime, many frail elderly patients may be better off left untreated than risk airways obstruction.⁵ β blockers should be discontinued immediately when a patient develops airways obstruction and their ophthalmolo-

gist subsequently informed. A repeat prescription that includes topical β blockers and drugs for asthma should automatically sound an alarm.

We thank Trish Greenhalgh and Azeem Majeed for their helpful advice.

Contributors: JFK and RW designed the study. JFK and CB performed the analysis, and JFK, CB, RW, and JAN interpreted the results. JFK, CB, and JAN wrote the paper. JFK is the guarantor of the study.

Funding: This study was funded by a grant from the International Glaucoma Association. JFK is supported by the Wellcome Trust (grant number 056045).

Competing interests: RW has been paid expenses to speak at meetings sponsored by companies marketing drugs for glaucoma. CB has received contributions towards travel expenses for two conferences from Pharmacia and Upjohn Ltd.

- 1 Bateman DN, Clark R, Azuara-Blanco A, Bain M, Forrest J. The impact of new drugs on management of glaucoma in Scotland: observational study. *BMJ* 2001;323:1401-2.
- 2 Charan NB, Lakshminarayan S. Pulmonary effects of topical timolol. *Arch Intern Med* 1980;140:843-4.
- 3 Diggory P, Cassels-Brown A, Vail A, Abbey LM, Hillman JS. Avoiding unsuspected respiratory side-effects of topical timolol with cardioselective or sympathomimetic agents. *Lancet* 1995;345:1604-6.
- 4 Stewart WC, Day DG, Holmes KT, Stewart JA. Effect of timolol 0.5% gel and solution on pulmonary function in older glaucoma patients. *J Glaucoma* 2001;10:227-32.
- 5 Quigley HA, Tielsch JM, Katz J, Sommer A. Rate of progression in open-angle glaucoma estimated from cross-sectional prevalence of visual field damage. *Am J Ophthalmol* 1996;122:355-63.

(Accepted 8 May 2002)

Impact of NHS Direct on general practice consultations during the winter of 1999-2000: analysis of routinely collected data

Rachel S Chapman, Gillian E Smith, Fiona Warburton, Richard T Mayon-White, Douglas M Fleming

The impact of NHS Direct on other primary care services in the United Kingdom has been the subject of recent debate.¹ A hospital bed crisis occurred in the winter of 1999-2000, but according to routine primary care surveillance systems the incidence of influenza-like illness did not reach epidemic proportions (as conventionally described).^{2,3} Considerable medical and media interest was given to influenza activity during this "millennium" winter.⁴ There was speculation that there was a genuine influenza epidemic but that people were telephoning NHS Direct and not seeking help from their general practitioner, resulting in an

artificially low incidence of influenza-like illness. At the time there was partial coverage of England and Wales by NHS Direct; we therefore used this "natural experiment" to assess whether the introduction of NHS Direct had any impact on episodes of influenza-like illness and other cases of respiratory infections seen by general practitioners.

Methods and results

We used general practices' telephone area codes to categorise those practices that participate in the Royal

Royal College of General Practitioners, Birmingham Research Unit, Harborne, Birmingham B17 9DB

Rachel S Chapman
primary care scientist
Douglas M Fleming
director

continued over

BMJ 2002;325:1397-8