contraction. Though there is no synchronized contraction in ventricular fibrillation all the muscle does contract intermittently and might retard for an instant flow in a vessel passing through it. For perfusion to reach subendocardial muscle a vessel will need to be open through the whole thickness of the wall. If the fibrillating stimulus is strong enough and frequent enough it could reduce the time available for blood to flow to the subendocardium; if the heart is hypertrophied the subendocardial muscle is further away from the surface and there is more chance that blood will be obstructed on its way to deeper muscle. In effect, diastolic time available for perfusion of subendocardial muscle is reduced by stronger fibrillation or hypertrophy. Finally, some workers (J. Utley, personal communication) have suggested that the vented left ventricle at surgery is smaller than usual and that the remoulding of muscle that must take place distorts and compresses the subendocardial veins. This would cause myocardial oedema and further reduction of inflow. That this might be important is shown by the improvement of coronary flow in dogs and man when after a long bypass mannitol is given intravenously.

Postoperative care.—Possibly a heart not badly damaged by surgery might acquire subendocardial ischaemia if during the postoperative period there is a low D.P.T.I.:S.P.T.I. for long periods.⁹ Measurement of left atrial and aortic pressures and attention to the D.P.T.I.:S.P.T.I. ratio might thus be useful in preventing ischaemic damage. At times, however, pharmacological manoeuvres might not be able to raise D.P.T.I.:S.P.T.I. without causing other problems. In these instances balloon aortic counterpulsation could be very useful.³⁶ The procedure lowers systolic pressure, thus reducing myocardial oxygen needs, and raises aortic diastolic pressure, thus increasing D.P.T.I.:S.P.T.I. and improving subendocardial perfusion. The procedure is not easy and has complications but potentially offers so much that it is being used with increasing frequency.

Conclusion

Not all myocardial damage is confined to subendocardial muscle, and there are many causes of myocardial damage other than that described here. Nevertheless, we believe that the studies of many workers have shown that there is a common and fundamental pathophysiological mechanism that can explain many of the clinical and pathological findings in patients with subendocardial ischaemia. More work is needed to define how

closely human disease follows the animal models and, in particular, what happens when there is ventricular hypertrophy and during various types of cardiopulmonary bypass. We hope that this review will stimulate others to provide the information.

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General Practice Observed

The General Practitioner and Changes in Obstetric Practice

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Summary

Compared with the 1960s fewer general practitioners

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today are obtaining a postgraduate diploma in obstetrics, and the future more stringent criteria for practitioners wishing to undertake this will probably restrict the numbers of family doctors wishing to practise in this field. More deliveries are being performed in institutions—either in consultant or general-practitioner units. Moreover, within a decade probably few G.P.s will attend during normal labour or delivery, which can and should be conducted by midwives. In future, therefore, G.P.s should have a new role in obstetrics, being respon-

sible for some antenatal supervision and postnatal care, including postnatal examinations, taking a cervical smear, and advice on birth control.

Circumstances which affect the role of the general-practitioner/obstetrician are changing rapidly. This paper examines the evidence for the nature of the changes and makes some predictions and comments, relating both to future clinical practice and to the educational needs of trainee general practitioners.

Most of the evidence, gathered from various sources, relates to the decade 1963-72. Great difficulty was encountered in evaluating the data published by the Department of Health and Social Security, which fail to discriminate consistently between data for the United Kingdom, England and Wales, and England alone.

Birth Rate

From 1955 to 1964 the number of live births and stillbirths in England and Wales showed a regular increase from just under 700,000 to just under 900,000. After 1964 they showed a steady decline, and in 1972 the total live births and stillbirths in England and Wales was 733,288.

The Standing Maternity and Midwifery Advisory Committee, reporting in 1970 on Domiciliary midwifery and maternity bed needs,¹ predicted, on the basis of the mid-1968 government actuary projections of live births, that "by 1972 the number [of births] will have reached the 1964 peak and will continue to increase but at a slower rate after 1973." This prediction was mistaken but encouraged the maintenance of an unnecessary number of maternity beds.

Delivery in Hospital

The proportion of women delivered in hospitals (in consultant or general-practitioner hospital beds) remained relatively constant at about 60% from 1948 to 1962. After 1962 there was a rapid increase in institutional deliveries (fig. 1),^{2,3} which probably resulted from a fall in birth rate, a more general recognition of the safety requirements during labour, a constant number of maternity beds available, and a shortening of the stay in hospital after delivery.

FIG. 1—Percentage of deliveries in institutions in England and Wales from 1960 to 1972^{2,3} and projected institutional delivery rate to 1976.

General-practitioner Hospital Obstetric Beds

The Cranbrook Report recommended that all general-practitioner/obstetricians should have access to general-practitioner beds and that these should be close to consultant maternity beds.⁴

Israel and Draper⁵ reported in 1971 that the number of

maternity beds specifically designated for use by general practitioners in England and Wales had increased by 85% between 1955 and 1969. Between 1969 and 1972 there was a further increase in England of 3.6%, the total number of available beds being 4,700 in 1972,⁶ but this did not represent a proportional increase in general-practitioner beds when taken as a percentage of consultant beds (fig. 2). Hobbs⁷ showed in 1967 that 68% of general-practitioner beds were further than five miles (8 km) from the nearest consultant unit. The value of such beds in terms of increased safety to the mother over home delivery is questionable.

More important is the use made of available beds. The trend in bed occupancy in England for consultant and general-practitioner/obstetric beds is shown in fig 2. Equivalent figures for England and Wales are not available. There has been a recent decline in the use of both types of beds, especially general-practitioner beds.

FIG. 2—Percentage occupancy of obstetric beds and proportion of general practitioner beds available as percentage of consultant beds from 1968 to 1972 in England.^{2,3,6}

Payment for Maternity Services

Claims for payment for services by general practitioners may be valuable indicators of services given. There is no way of knowing how many general practitioners fail to make claims for payments for maternity services, but even if such failure exists it, presumably, does not vary significantly from year to year. Accepting this proviso, the evidence provided by records of claims is very revealing.

General practitioners may claim for complete maternity care, which includes complete antenatal care, care during confinement, and complete postnatal care. Claims for partial maternity care can also be made and include one or more of the following: complete or partial antenatal care, care during confinement, and complete or partial postnatal care.

Thus, a claim for partial antenatal care together with complete postnatal care constitutes a single claim but contains two components. The Department of Health and Social Security make an annual analysis of a 10% sample of claims made by general practitioners for maternity services. The analysis shows the total number of claims and also the component parts of claims (table I, figs. 3 and 4). The numbers of live births, claims for complete obstetric service, and total claims for obstetric service are shown in fig. 3. While the claims for complete service followed the downward trend in birth rate the total number of claims remained more stable and in 1972 almost equalled the total number of births.

The percentage of total claims which contained a claim for confinement is shown in fig. 4. There is a linear regression which, if projected, means that the general practitioner will be disassociated with confinement by 1983. A change in the

TABLE 1—Claims for Maternity Benefit made by General-practitioner/Obstetricians in England and Wales during 1963-72

Year	No. of claims which included Claims for Confinement	No. of claims for Antenatal care without Confinement	No. of claims for Postnatal Care without Confinement	No. of Claims for Abortion	Total Claims*
1963	377,822	225,905	117,427	43,278	663,890
1964	375,210	256,371	134,852	48,419	702,728
1965	361,553	273,842	151,650	47,511	709,120
1966	340,705	286,184	164,884	47,612	705,412
1967	329,897	307,320	182,779	48,685	719,125
1968	301,668	325,364	189,523	49,772	710,712
1969	283,149	342,668	200,470	49,463	709,104
1970	252,345	352,113	216,221	51,181	689,649
1971	240,816	388,969	239,681	48,734	715,898
1972	210,577	380,937	219,470	47,494	673,619

* Total claims does not represent sum of claims shown because claims which included claims for partial antenatal and partial postnatal care were recorded as single claims.

FIG. 3—Comparison of total births with total claims by general practitioners for obstetric service (complete or partial) and claims for complete service.

FIG. 4—Claims for complete obstetric service by general-practitioner/obstetricians as percentage of all claims in England and Wales 1963-72 and projection of trend to 1983.

trend could still occur and it is difficult on present evidence to predict the ultimate level of attendance by general practitioners on women in labour.

In the same decade there was an increase in the proportion of claims for partial antenatal care which were not associated with claims for confinement from 25.3% to 40.1%. An increase from 15.0% to 27.9% occurred in claims for partial postnatal care without claims for confinement. Claims for full antenatal care and full postnatal care without claims for confinement almost doubled during the decade 1963-72. This may indicate a trend towards increased confidence by consultants in the abilities of general practitioners to conduct full antenatal and postnatal care while confinement is planned to take place in hospital.

Doctors Admitted to Obstetric List (England and Wales)

The number of doctors admitted to the obstetric list maintained a relatively stable relationship with the number of doctors entering general practice as principals for the first time (Department of Health and Social Security statistics department).

General practitioners may be admitted to the obstetric list if they fulfill various criteria.⁸ The most demanding criterion is a six-month, full-time, residential hospital appointment in obstetrics. The least demanding involves regular work in an obstetric unit or units over six consecutive months including at least 20 normal deliveries and attendance at not less than 10 antenatal and two postnatal clinics.

The national figures for the distribution of the qualifications of doctors entering the obstetric list are not collated. The usefulness of such records is indicated by the evidence of a sample of eight executive councils provided by the obstetric working party of the Royal College of General Practitioners for the years 1963, 1967, and 1971. In these 8 executive council areas the number of doctors entering the obstetric list was 145 in 1963, 121 in 1967, and 81 in 1971. The percentage distribution of the most demanding and least demanding qualifications is shown in fig. 5. There is a disturbing convergence. When this is related to the percentage of claims for maternity service which contain a claim for confinement it might be concluded that obstetric training is believed to be less important if no intranatal care is provided.

FIG. 5—Qualifications of doctors entering obstetric lists (sample of eight executive councils) compared with claims for confinement in 1963, 1967, and 1971.

TABLE II—Analysis of Advertisements in "Partnerships Offered" Section of British Medical Journal in 1961 and 1971

Year	No. of Advertisements*	No. (%) of Requests for Obstetric Experience	No. (%) of Requests for D.OBST. or M.R.C.O.G.	No. (%) with G.P. Maternity Unit Available
1961	477	200 (41.9)	22 (4.6)	18 (3.8)
1971	1,575	312 (19.8)	11 (0.7)	216 (13.7)

*Excluding apparent reduplications.

British Medical Journal Advertisements

The Advisory Committee on General Practice of the Council for Postgraduate Medical Education in England and Wales stated in 1963⁹ that "the proportion of practices requiring new entrants to have had obstetric experience is unknown." A

comparison of advertisements in the Partnerships Offered section in the *British Medical Journal* for the whole of 1961 and 1971 showed a significant change in the demand for both experience of and special qualifications in obstetrics (table II). At the same time there was an increase in the offering of general-practitioner maternity beds, which may have reflected the trend in availability.

Discussion

Clearly in the near future all but untimely or precipitate deliveries will take place in hospitals or nursing homes. Though the ensuing safety of mother and baby seems self-evident Fryer and Ashford¹⁰ sound a word of caution in their report of a 10-year analysis of perinatal mortality in England and Wales. These authors show that for births of more than 2,500 g the local authorities with the higher hospitalization rates no longer tend to have lower infant mortality rates.

On present indications it seems that within a decade, general practitioners, with a few exceptions, will not attend during labour or at delivery. Normal labour and delivery can and should be conducted by midwives, who should be taught to repair the perineum. Interventive obstetrics beyond the role of the midwife will in the future be conducted by doctors working as members of a hospital team, some of whom may be general practitioners.

FUTURE OBSTETRICAL TRAINING FOR GENERAL PRACTITIONERS

Both the Royal College of Obstetricians and Gynaecologists and the Royal College of General Practitioners accept, albeit reluctantly, that the necessary experience and training for a general-practitioner member of the hospital team is that recommended by the D.H.S.S. for the hospital practitioner grade.¹¹ The necessary training for this grade is two years whole time in the specialty. The severity of this training criterion must inevitably restrict the number of practitioners who wish to enter this grade and the necessary training will not be a part of general vocational training.

It may be argued that every general practitioner will continue to be at some risk of having to attend a woman in labour in her own home. Accidents can happen. Nevertheless, such incidents seldom, occur and the probability of the general practitioner being immediately available is even smaller. Certainly, expectation of such events does not call for obstetric training beyond that attainable at undergraduate level.

POSTNATAL CARE

The analysis of claims by general practitioners for antenatal care and postnatal care shows a progressive increase in both, but the proportion of claims for complete antenatal and postnatal care is small. Less than 5% of claims are for complete postnatal care despite widespread acceptance of "early discharge" after delivery. Postnatal care involves recognizing the physical, mental, and social complications of the postnatal period, undertaking a postnatal examination, including a cervical smear, and advising on birth control. These activities are more fitting to the role of the general practitioner than to the most junior member of the hospital team, who usually attracts this work in the hospital. Consideration should be given to discontinuing all postnatal work in specialist units and placing the responsibility for this part of maternity care on the shoulders of general practitioners. If postnatal care is adequately conducted in health centres or group practices the necessary training for the future can and should be conducted at these places during vocational training.

ANTENATAL CARE

Antenatal care presents an entirely different problem. The proportion of complete antenatal care undertaken by general practitioners, though increasing, is still relatively small (16.5%). Shared antenatal care has not been, and probably cannot be, tidily defined. Interpretation often rests with obstetricians who may apply differing criteria according to their knowledge of individual general practitioners.

The identification of rhesus incompatibility, the significance of weight gain early in pregnancy, and, more recently, the identification of the immature baby syndrome and genetic abnormalities have led to specialists beginning their share of antenatal care progressively earlier in pregnancy. This need not happen if the emphasis of training for the general practitioner is displaced from intranatal care to antenatal care.

Macnaughton¹² has recently suggested that specialist examinations, as part of shared care, should take place routinely at eight to 10 weeks and at 20 weeks, 30 weeks, 36 weeks, and from the 39th week. The emerging pattern of sharing is clearly different from that which is traditionally accepted. If Macnaughton's method is both sensible and vigorously pursued then probably the role of the general practitioner in antenatal care and the training for that role will be reduced.

During the antenatal period women should be prepared for the events of labour. The general practitioner, being increasingly divorced from participation in labour, becomes less able to carry out this role. The increasing tendency towards artificial and mechanical induction of labour and new methods of analgesia are but two new areas of knowledge about which someone needs to be well informed to advise the pregnant woman and alleviate her fears during the antenatal period. Disassociation from practical experience of labour does not help the general practitioner to give necessary reassurance.

PREPARING FOR THE FUTURE

Hence, in the future general practitioners should be responsible for postnatal care and some antenatal care. It can no longer be assumed that their training amounts to six months full-time residence in hospital. Rather, a combination of much shorter and selected hospital experience and experience in selected general practices should be considered. Vocational training programmes, which blindly encourage trainees to spend six months in a hospital obstetric post, may not be providing the best form of teaching. Now is the time to recognize the most likely future obstetric role of the general practitioner and to determine the training necessary to prepare for this role.

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