This submission is intended to address the following questions:

a) Does induced abortion lead to an increased risk of preterm delivery in subsequent pregnancies?

b) Have there been significant improvements in the chances of survival for extremely premature infants since the amendment of the Abortion Act in 1990?

Executive summary

- There is strong, robust and widely accepted scientific evidence that induced abortion leads to an increased risk of premature birth in subsequent pregnancies.
- The increased risk of a preterm delivery is between 1.3 and 2.0 and rises with the number of abortions.
- It is estimated that abortion in the UK leads to approximately 400 additional very premature births each year, of which around half are extremely preterm (less than 28 weeks). This will result in at least 40 additional neonatal deaths per year.
- The consequential costs of the additional premature births in the UK together with the risks of long-term disability may be between 30 and 60 million pounds per year.
- Health professionals and abortion providers have a duty to ensure that women and their partners are informed of the potential risk that abortion carries for subsequent pregnancies.
- There have been substantial advances in the care of extremely premature babies born at the limits of viability, since the Abortion Act was amended in 1990.
- A significant proportion of babies born at 23 and 24 weeks gestation and cared for at major centres, are now surviving, and it is likely that survival figures will continue gradually to improve over the next decade.

Introduction

1. I am Professor of Neonatal Paediatrics at University College London and Honorary Consultant Neonatologist at University College London Hospitals Foundation NHS Trust. My area of expertise is the intensive medical care of newborn infants and the causation and consequences of brain injury in the newborn. I have been a Consultant Neonatologist at a major regional referral centre since 1988. I am a member of an internationally-recognised multidisciplinary research group at University College London, investigating
the mechanisms, consequences and prevention of brain injury in newborn babies. My qualifications are BSc, MBBS, FRCP, FRCPCH, DCH.

Does induced abortion lead to an increased risk of preterm delivery in subsequent pregnancies?

2. A highly significant number of reputable scientific studies investigating the association between induced abortion and increased risk of preterm delivery have been published in peer-reviewed journals. In January 2003, Thorp and colleagues published a detailed review of the available scientific evidence. They analyzed results for 24 published studies of the effect of induced abortion on the risk of preterm birth in subsequent pregnancies\(^{308}\). The authors reported that 12 of the studies found a positive association with increased risk ratios which were consistently between 1.3 and 2.0. Seven published studies found a dose-response effect, in that the risk estimate increased with increasing numbers of induced abortions. Each of three large cohort studies performed in the 1990s showed an increased risk of preterm delivery and a dose-response effect. These studies had attempted to avoid recall bias by obtaining data on induced abortions from prospectively obtained records rather than self-reporting.

3. Another detailed review of the scientific literature by Rooney and Calhoun\(^{309}\), published in 2003, concluded that at least 49 studies had demonstrated a statistically significant increased risk of premature birth or low birth weight following an induced abortion. Again the majority of studies showed a dose-response relationship, and the greatest increased risk involved extremely preterm infants below 28 weeks of gestation. It is striking that only 8 studies failed to show an increased risk of preterm delivery and no published studies demonstrated a protective effect of previous induced abortion. The magnitude of the increased risk with 2 or more previous abortions was substantially greater than that associated with maternal age, marital status, parity or socioeconomic status. Hence the authors argued that it was most implausible that the statistical association could be explained by confounding socioeconomic factors.

References


4. In 2005 Moreau and colleagues published a detailed report based on data from the EPIPAGE study\textsuperscript{310}, a very large and well-validated study of very preterm infants, performed in France. Information was collected from all maternity wards in 9 French regions in 1997. Data on previous induced abortions were taken from hospital records in order to reduce recall bias. The study was population-defined to exclude selection bias. The authors tested the prior hypothesis that induced abortion would increase the risk of subsequent very preterm birth due to infectious or mechanical processes, but not the risk of very preterm delivery due to vascular causes, especially hypertension.

5. Using a case control methodology three groups of infants were enrolled;\textsuperscript{1843} 1843 very preterm live infants born at less than 33 weeks gestation, 276 infants born at 33 to 34 weeks of gestation and 618 unmatched full-term control infants born at 39 to 40 weeks. The authors concluded that a history of induced abortion correlated with an increased risk of very preterm birth (adjusted odds ratio, 1.6; 95% confidence interval 1.2 – 2.1). Where there was a history of more than 1 previous induced abortion, the adjusted odds ratio was 2.9 (95% confidence intervals 1.3 – 6.5) Controlling for maternal characteristics such as age, education and history of smoking, had very little effect on the magnitude of the increased risk. The association was unchanged if women with previous preterm delivery were excluded. This study found that there was no relationship between induced abortion and subsequent preterm delivery resulting from pre-eclampsia. There were however significantly increased risks for preterm delivery resulting from antepartum haemorrhage, isolated fetal growth restriction, premature rupture of membranes and spontaneous onset of labour. The risk of preterm delivery associated with induced abortions tended to be higher for extremely preterm deliveries between 22 and 27 weeks of gestation (odds ratio 1.7) compared with delivery at 28 - 34 weeks of gestation (OR 1.4). A statistical association between previous induced abortion and very preterm delivery in the presence of fetal growth restriction was apparent in infants born at 28 to 32 weeks gestation.

6. The authors concluded that their findings could not be explained as the consequence of methodological biases or the effect of confounders. Their findings were consistent with other recent studies that gave adjusted odds ratios between 1.3 and 2. They concluded that a history of induced abortion increases the risk of very preterm birth, particularly extremely preterm deliveries.

7. In another recent study, Ancel and colleagues analysed data from ten European countries (the EUROP survey)\textsuperscript{311}. A total of 2938 preterm births

\textsuperscript{310} Moreau C, Kaminski M, Ancel PY et al. Previous induced abortion and the risk of very preterm delivery: results of the EPIPAGE study. \textit{BJOG} 2005; 112: 430-437

and 4781 controls at term were included. Data were obtained from European countries with widely varying rates of induced abortion. The authors concluded that previous induced abortion was significantly associated with preterm delivery and the risk increased with the numbers of abortions. The adjusted odds ratios varied between 1.2 and 1.8. The statistical association did not significantly vary between countries with high and low rates of induced abortion. As with the French study reported by Moreau et al, the extent of the statistical association varied according to the cause of the preterm delivery. Delivery due to spontaneous onset of preterm labour, premature rupture of membranes and antepartum haemorrhage were all positively associated with induced abortion, whereas delivery due to maternal hypertension was not associated. The strength of the association between induced abortion and premature delivery increased with decreasing gestational age.

8. The mechanisms underlying this association have not been elucidated. However it is striking that there is a consistent relationship between abortion and preterm delivery related to infectious and mechanical factors but no relationship with delivery due to maternal hypertension or vascular abnormalities. There is considerable evidence that induced abortion increases the risk of infectious complications in a later pregnancy\textsuperscript{312}. This may result from the revival of latent local infectious processes caused by surgery at the time of the abortion or may be related to mechanical factors leading to ineffective cervical closure with an increased risk of ascending genital tract infections. Cervical instrumentation has also been suggested to increase the risk of endometrial damage, thus impairing trophoblastic invasion and migration. This would increase the risk of placenta praevia which is a major cause of antepartum haemorrhage, leading to preterm delivery.

9. In conclusion, the scientific evidence of a causal link between previous induced abortion and increased risk of preterm delivery appears to be remarkably robust and consistent. The effect is consistent across many different countries with widely differing socioeconomic backgrounds and widely differing attitudes towards induced abortion. The effect is also consistent between studies published over a 50 year period from the 1960’s until 2005 and with a wide variety of study methodologies. The effect is biologically plausible in that there is a consistent dose-response relationship and a consistent positive relationship between abortion and preterm delivery related to infectious and mechanical factors but no relationship with delivery due to maternal hypertension or vascular abnormalities.

10. Extremely preterm delivery is associated with a high risk of death in the neonatal period and with a greatly increased risk of brain damage. Sadly, preterm delivery due to infectious or haemorrhagic causes are particularly associated with brain injury, leading to a substantially increased risk of permanent disability including cerebral palsy, severe learning difficulties and

\textsuperscript{312} Muhlemann K, Germain M, Krohn M. Does abortion increase the risk of intrapartum infection in the following pregnancy? \textit{Epidemiology} 1996; 7: 369-376.
Hence there is substantial evidence that induced abortion will result in death in a significant number of infants born extremely preterm, as well as to a significantly increased risk of subsequent children surviving with permanent disability.

Approximately 5% of all infants are born before 37 weeks of gestation in England and Wales, (equivalent to about 33500 per year) and approximately 1.4% are born at less than 33 weeks (equivalent to about 9400 per year). About 0.4% or about 2700 per year are born at less than 28 weeks. Approximately 50% of all abortions in England and Wales are undertaken in women under the age of 25 years, whereas 75% of all livebirths occur at a maternal age above 25 years (UK birth statistics). Thus the majority of women who are considering abortion will subsequently deliver one or more live children.

On the basis of published data, approximately 14% of all women in UK who deliver have had a previous induced abortion. Using this figure, and a relative risk of 1.3 gives an attributable risk of approximately 400 additional preterm infants born in the UK at less than 33 weeks per year. In extremely preterm infants a higher relative risk of 1.6 gives an attributable risk of about 230 additional infants per year born at less than 28 weeks.

Each additional extremely preterm infant will have substantial acute care costs to the NHS of approximately £30,000 -100,000. In addition there is, unfortunately, a 15-20% chance of substantial long-term disability in these infants, leading to lifetime costs to society which may approach £1 million or more for each child (costs estimated from current NHS negligence claims). In addition, with an overall mortality of at least 20%, it is likely that at least 40 additional premature infants will die in the neonatal period each year.

Hence it can be concluded, on conservative estimates, that the consequential costs to society from preterm delivery associated with induced abortion amount to very approximately £30-60 million per year.

15. Health professionals and abortion providers have a duty to ensure that women and their partners are informed of the potential risk that abortion carries for subsequent pregnancies.

b) Have there been significant improvements in the chances of survival for extremely premature infants since the amendment of the Abortion Act in 1990?

16. Although mortality and morbidity remains relatively high, there is consistent evidence of a steady improvement in survival year-on-year for extremely preterm infants born at 24 weeks gestation or less. In 1995 the EPICURE study undertaken in the entire of UK and Ireland showed that average survival to discharge across the UK was 26% of live births at 24 weeks and 11% at 23 weeks\(^{318}\). In 2004 Hoekstra and colleagues\(^{319}\) published detailed outcome data for a cohort of infants born between 23 and 26 weeks of gestation at a single tertiary neonatal centre in Minneapolis, USA, over a 15 year period (Hoekstra et al. 2004). These data show a consistent year-on-year improvement in survival and for the period 1996-2000 there was an overall survival rate following admission to NICU of 66% at 23 weeks of gestation and 81% at 24 weeks of gestation. Similarly Doyle and colleagues\(^{320}\), in a study of extremely premature babies delivered in the State of Victoria in Australia found increased survival from 1991 to 1197 with recent data providing an overall survival rate of 41% at both 23 and 24 weeks of gestation. Data from a prospectively-defined long-term follow-up study at the Neonatal Intensive Care Unit at University College London Hospital has shown survival rates in the period 1996 to 2000 of 42% at 23 weeks and 72% at 24 weeks\(^{321}\). Survival at 22 weeks of gestation is unusual but has been observed in a number of major neonatal centres. In long-term follow-up studies, a significant minority of extremely preterm survivors have had some form of neurodevelopmental impairment with significant disability identified in 15-25% of survivors.

17. Obstetric and neonatal care are continuing to change and improve at an extraordinary pace. By their very nature, long-term outcome studies represent the outcome following a standard of care which has become outdated. Since the nationwide EPICURE study in 1995 there have been very significant and


wide-reaching improvements in the quality of care provided, in the frequency
of in-utero transfer to major perinatal centres, the level of training of neonatal
and obstetric staff, the provision of specialist resources, and the educational
and behavioural care and therapeutic resources which are available to
disabled children following discharge from hospital. Hence historical data
must be used with appropriate caution when applied to children born in the
present.

18. The data from recent studies indicate that there has been continuing
improvement in the survival of extremely preterm infants over the last 15-20
years with very substantial numbers of infants now surviving at 23 and 24
weeks of gestation. Although major improvements in survival at these
gestational ages seem unlikely in the next few years, it is likely that continuing
advances in neonatal and obstetric care will lead to incremental improvements
in survival and to reductions in long-term morbidity.

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