reflects improvements in patient care rather than case selection.

In response to de Miguel-Yanes et al.: we did not evaluate the subgroup with diabetes in our initial analysis. However, in contrast with de Miguel-Yanes et al., after stratifying our sample according to the presence of diabetes we observed higher mortality for the subgroup of patients with diabetes, and this difference persisted over time.

We agree with Hussain and Al-Omran that surgical volume is an important predictor of outcomes for abdominal aortic aneurysm repair.[1] In our previous work, we found that the relationship between hospital volume and outcomes was quite different for endovascular repair versus open repair and that experience with one type of repair did not carry over to improved outcomes in the other type of repair. We therefore did not conduct propensity-score matching for procedure volume in our analysis, since doing so would have been helpful only for comparisons of the same procedure, not for comparisons between different procedures.

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Since publication of their article, the authors report no further potential conflict of interest.

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Healthy Babies after Intrauterine Transfer of Mosaic Aneuploid Blastocysts

TO THE EDITOR: Chromosomal aneuploidy is recognized as a factor that contributes to unsuccessful embryo implantation and spontaneous abortion. It provides an explanation for the relatively low success rate of in vitro fertilization (IVF) treatments. Preimplantation genetic screening is widely used to identify chromosomally normal (euploid) embryos and select them for intrauterine transfer in order to improve the clinical outcome of IVF.[1]

Chromosomal mosaicism is a relatively common finding in IVF-derived human embryos.[2] Mosaic embryos, which are characterized by the presence of a mixture of diploid and aneuploid cell lines, are not usually transferred because they are deemed to be abnormal. Although the effect of mosaicism on implantation and the developmental potential of these embryos is not known, it is reasonable to assume that mosaicism reduces the likelihood of success of IVF.[3]

The low levels of mosaicism reported in prenatal specimens and the reduced incidence of mosaicism with increasing gestational age suggest that there exists a mechanism by which mosaic aneuploidy is corrected or by which aneuploid cells are "outcompeted" by euploid cells.[4] To our knowledge, healthy live births after transfer of mosaic aneuploid blastocysts obtained by means of IVF have not been reported. However, a previous study in which the researchers were unaware of the results of genetic screening may have involved the transfer of mosaic embryos that resulted in clinical pregnancies.[5]

Between May 2013 and July 2014, we analyzed 3802 blastocysts by means of array-comparative genomic hybridization testing (see the Supplementary Appendix, available with the full text of this letter at NEJM.org). We detected chromosomal mosaicism in 181 blastocysts (4.8%). The transfer of mosaic embryos was made available to a consecutive nonselected series of 18 women for whom IVF had resulted in no euploid embryos. We provided the results of the genetic screening to the women and counseled them on the potential consequences of transferring a mosaic embryo. We tailored the counseling according to the type of aneuploidy.

An institutional ethics committee approved the protocol (available at NEJM.org), and we obtained written informed consent from each woman before proceeding with embryo implantation. All the women elected to undergo implantation (only one mosaic blastocyst was available in each case). Eight clinical pregnancies (maternal serum positive for the beta subunit of human chorionic gonadotropin) ensued, of which six resulted in the birth of a singleton infant at term. All pregnancies that went to term were confirmed, by

Table 1. Clinical Outcomes of Single Mosaic Blastocysts Transferred.*

Patient No.	Chromosomal Constitution	Mosaicism†	Karyotype‡	Clinical Outcome
		percent		
1	arr(4)x1,(10)x1	40	46,XX	Baby healthy at birth
2	arr(6)x1,(15)x1	50	46,XX	Baby healthy at birth
3	arr(2)x1	40	46,XX	Baby healthy at birth
4	arr(2)x1	35	46,XY	Baby healthy at birth
5	arr(5)x1	50	46,XX	Baby healthy at birth
6	arr(5)x1,(7)x1	40	46,XX	Baby healthy at birth
7	arr(11)x1,(20)x3,(21)x3	30	NA	No pregnancy
8	arr(1)x1,(6)x3,(10)x3,(12)x3,(13)x3,(14)x3,(21)x3	50	NA	No pregnancy
9	arr(3)x1,(10)x3,(21)x3	35	NA	No pregnancy
10	arr(1)x3	50	NA	Biochemical pregnancy§
11	arr 9p21.2q34.3(26,609,645-140,499,771)x3	45	NA	Biochemical pregnancy§
12	arr(15)x3	30	NA	No pregnancy
13	arr(18)x1	50	NA	No pregnancy
14	arr(18)x1	50	NA	No pregnancy
15	arr(18)x1	40	NA	No pregnancy
16	arr(4)x1	50	NA	No pregnancy
17	arr(5)x3	40	NA	No pregnancy
18	arr 10q21.3q26.3(67,216,644-134,326,648)x3	50	NA	No pregnancy

* NA denotes not available.
† The approximate percentage of aneuploid cells in the transferred blastocyst is listed (see the Supplementary Appendix).
‡ The karyotype was determined by means of chorionic-villus sampling.
§ Biochemical pregnancy was defined by the presence of a low peak in levels of the beta subunit of human chorionic gonadotropin (β-hCG) (<100 mIU per milliliter), a rapid decrease in the urinary or serum β-hCG concentration, and no substantial delay in the onset of the next menstrual period, but with no detection of an identifiable pregnancy by means of ultrasonographic examination.

means of sampling of the chorionic villi, to have a normal karyotype (Table 1).

Our study shows that mosaic embryos can develop into healthy euploid newborns. These findings have implications for women who undergo IVF resulting in mosaic embryos but no euploid embryos.

We hypothesize that the extent and type of mosaicism affect the IVF success rate; our data were insufficient to test this hypothesis. Our study was small, and additional clinical data must be obtained before this approach can be evaluated for routine integration into preimplantation genetic screening programs in women undergoing IVF. Transfer of mosaic embryos with purportedly "viable" aneuploidies should be considered with extreme caution.

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