**Sperm relative telomere length and distribution do not affect either early embryo morphokinetic or ICSI outcome**

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**Study question:** Do sperm relative telomere length and distribution impact early embryo morphokinetic development and ICSI outcome?

**Summary answer:** No significant correlation was found between sperm telomere length (STL) and distribution and early embryo morphokinetic parameters as well as ICSI outcome.

**What is known already:** Sperm telomere shortening is more frequently associated with sperm nuclear alterations such as DNA fragmentation and aneuploidy and patients with shorter sperm telomere length present lower rates of natural pregnancy, fertilization and goof quality embryos after IVF or ICSI. However, these data are controversial.

**Study design, size, duration:** We conducted an observational retrospective study including 68 couples consulting for male factor infertility at the Reproductive Biology Laboratory-CECOS of Rouen University Hospital between October 1, 2014 and October 31, 2019.

**Participants/materials, setting, methods:** Infertile males presented semen parameter alterations and a normal blood karyotype. Relative telomere length and distribution were assessed by quantitative fluorescent in situ hybridization (Q-FISH). A total of 108 ICSI cycles were analysed with a total of 333 embryos, 55 pregnancies and 48 live births.

**Main results and the role of chance:** No significant correlation was found between sperm relative telomere length and distribution and early embryo morphokinetic parameters and when considering the rates of fertilization, embryo cleavage, pregnancy, live-birth and pregnancy loss. However, infertile males presenting spermatozoa with shorter relative telomere length had also a reduced sperm progressive motility (*P=0.0207*), more telomere signals per spermatozoon. In addition, infertile males with shorter STL had a lower progressive motility, more telomere signals per spermatozoon (*P<0.0001)* and a lower percentage of sperm nuclei presenting a normal telomere distribution of ≤23 telomere-telomere dimers (*P<0.0001*) compared to controls.

**Limitations, reasons for caution:** Our retrospective study included infertile couples who have obtained high rates of pregnancy and live birth after ICSI when considering the rank of ICSI cycles. Our study has only explored the morphology and kinetics of early embryonic development but did not assess other markers of embryo quality such as aneuploidy or epigenetics marks that could be modified by a reduced telomere length and abnormal telomere distribution in sperm nuclei. However, the testing of aneuploidy and epigenetics marks of preimplantation embryos is not currently allowed by the French rules.