Aim: To assess the role of total serum estradiol on the day of injection HCG, estradiol per mature follicle and estradiol per oocytes retrieved on clinical pregnancy rate and oocyte/embryo quality in assisted reproduction.

Materials and Methods: A retrospective review of three hundred and forty two in vitro fertilization cycle with normal ovarian reserve who underwent long GnRH agonist protocol were included. Outcomes assessed are number of oocytes retrieved (OR), number of mature oocytes (MO), number of oocytes fertilized (FO), fertilization rate (FR), number of embryos cleaved (EC), cleavage rate (CR), number of Grade I embryos (E), number of cryo-preserved embryos (CPE) and clinical pregnancy rate (CPR). The Estradiol/follicle ratio (E2/fol) was defined as estradiol level per mature follicle >14mm in diameter. Estradiol/oocyte (E2/O) ratio was defined as estradiol level per oocytes retrieved. These two ratios were categorized by 25th percentile into four groups.

Results: A positive correlation was seen between E2/fol and oocytes retrieved ($r=.334$, p-value=.0001), no. of mature oocytes ($r=.335$, p-value=.0001), no. of oocytes fertilized ($r=.222$, p-value=.002) and number of cryopreserved embryos ($r=-.289$, p-value=.0001). Increased clinical pregnancy rate (CPR) was seen in Group C (E2/fol= 200-299.99) compared to Group A, B & D (p-value=.033). With E2/O ratio negative correlation was seen between E2/O and oocytes retrieved ($r=-.281$, p-value=.002), mature oocytes ($r=-.296$, p-value=.008), oocytes fertilized ($r=-.220$, p-value=.003), embryos cleaved ($r=-.211$, p-value=.004), Grade 1 embryo ($r=-.216$, p-value=.001), cryo-preserved embryos ($r=-.206$, p-value=.005). No difference in fertilization rate, cleavage rate or clinical pregnancy rate was seen. No difference was seen in clinical pregnancy rate with total serum estradiol.

Conclusion: In conclusion serum estradiol is an important determinate of IVF success. While total serum estradiol does not exert any positive or negative influence on IVF outcome, estradiol per mature follicle and retrieved oocytes does have an impact. Pregnancy rate is better when E2/fol is between 200-299.99 pg/ml. Also increasing serum E2/fol positively correlates with better oocytes and embryo quality. In contrast E2/O negatively correlates with oocytes and embryo quality parameters.