

## Hyperbaric Oxygenation Therapy in Infertility Patients

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**Received:** February 06, 2016, **Accepted:** February 10, 2016, **Published:** February 15, 2016

Modern era of infertility treatment with the advent of the reproductive technologies increased the success of infertility treatment but still not enough. After identification of the risk factor that may explain the infertility usually we perform clear steps in diagnostic and therapeutic procedures with different successful rate.

Embryo quality, endometrial receptivity, repeated implantation failure, ovarian reserve and quality of the spermatozoa are the most common factors which can cause infertility.

Implantation will usually only take place if a good blastocist exist and if the endometrium has reach a certain stage of receptivity with the adequate oxygenation, vascularisation, endometrial grow with development and expression of different gens and molecular factors -causing optimal endometrial receptivity.

To improve all of this factors contributing to different individually infertility factors and events we use hyperbaric oxygenation therapy with different protocol regimes for more than 15 years. The patients were treated in multiplaced chamber at pressure of 2.1 ATA to 2.3 ATA during 70 minutes, 7 -10 days consecutively beginning from the day 2nd - 5th of menstrual cycle.

The evaluation of effects of hyperbaric oxygen therapy was carried out and we notice improvement of endometrial oxygenation and vascularisation, with better eggs quality, better respond to ovarian stimulation, better embryo quality and higher pregnancy rate.

Folliculometry in the cycles when hyperbaric oxygen therapy was applied indicated an excellent response of endometrial (thickness of endometrium at the time of ovulation was better and triple line endometrium). Desirable quality of endometrium was significantly better in the cycle when HBO therapy had been applied but also we noticed prolongation of the effects in the next month as well. The power doppler and 3DPD of the uterine arteries indicated that the uterine blood vessel resistance was slightly higher than expected, but that was expected reaction of the major blood vessels on hyperbaric therapy. Mapping of subendometrial blood vessels in the cycles covered and followed

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by hyperbaric oxygen therapy showed the intensive capillary network of endometrium especially after 4-6 weeks after HBO therapy. The oxygen used under higher pressure -- oxygen as a drug, may have an extraordinary significance for better outcome of pregnancy implantation by improving endometrial receptivity. If endometrial receptivity is conditioned by adequate grow, vascularisation and oxygenation, and then hyperbaric oxygen therapy is the treatment of choice.

From the other side we also treated patients with male factor infertility. Significant increase in motor activity was registered as well as increased spermatogenesis after two months after therapy. The biggest increased in vigilance of spermatozoids was found in the samples during in vitro preparation with good quality sperm preparation mediums. The obtained results suggest that the acute exposure of the sperm samples to HBO has favorable impact to functional capacity of spermatozoids in view of their better motility. Prolongation and postpone effects of hyperbaric oxygen therapy were verify by control spermogram-semen analysis after 70 to 90 days after therapy with the results of the good induction of the spermatogenesis, thanks to hyperbaric oxygen and elimination of the reactive oxygen species and avoiding infection due to hyperoxia. There are also good effects on the DNA integrity with less DNA fragmentation in hyperoxia condition.

There are many factors that ultimately impact on the male and female fertility and chances of conceiving, but our experience show that hyperbaric oxygen therapy could have positive impact on infertility treatment and increase male and female fertility.