CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1256367

Available online at: http://www.iajps.com *Research Article*

A CROSS-SECTIONAL RESEARCH: INCIDENCE OF TUBAL ECTOPIC PREGNANCY VERSUS PROLIDASE ACTIVITY AND OXIDATIVE STRESS: ONE YEAR RESEARCH EXPERIENCE AT SERVICE HOSPITAL, LAHORE

[1]Dr. Adeel Iqbal, [2]Dr. Misha Saeed, [3]Dr. Saqlain Amjad

[1]DHQ Hospital, Faisalabad

[2]Allied Hospital Faisalabad

[3]Medical Officer, Govt. Haji Abdul Qayyum Teaching Hospital Sahiwal

Abstract:

Objective: *Research was aimed at the determination of the serum prolidase and oxidative status activity in the tubal ectopic pregnancies and it also aimed at the observation of the link between the two.*

Methods: *Design of the research was cross-sectional which was carried out from October, 2016 to November, 2017 at Obstetrics & Gynecology Department (Services Hospital, Lahore) with sample size of forty healthy pregnant women. Measurement of the activity of prolidase serum was carried out through spectrophotometrically. We used total capacity of the antioxidant for the determination of the oxidative status. Analysis of the data was carried out with the help of SPSS.*

Results: *In the ectopic pregnancies the total capacity of the antioxidant was observed as low in comparison to the healthy cases with p-value as (< 0.018); whereas, oxidative stress index, total oxidant status and prolidase activity was observed high with a significant p-value as (< 0.05).*

Conclusion: *We may associate ectopic pregnancy with an increased activity of the serum prolidase and stress of the oxidative. We may correlate it for the provision of the better awareness of the ectopic pregnancy pathogenesis.*

Keywords: *Prolidase activity, Ectopic pregnancy, Total oxidant status, Total antioxidant capacity and Oxidative stress index.*

Corresponding author:

Dr. Adeel Iqbal,
DHQ Hospital,
Faisalabad

QR code

Please cite this article in press Adeel Iqbal et al., ***A Cross-Sectional Research: Incidence of Tubal Ectopic Pregnancy versus Prolidase Activity and Oxidative Stress: One Year Research Experience At Service Hospital, Lahore,*** *Indo Am. J. P. Sci, 2018; 05(05).*

INTRODUCTION:

One of the complications in the pregnancies is an ectopic pregnancy where an implantation of the fertilized ovum is found outside uterine cavity. The incidence of ectopic pregnancies is observed about (2%); among these cases occurrence in the fallopian tubes is observed as (98%). Risk factor are also associated sometimes known and mostly unknown [1]. Diagnostic facilities help in an early ectopic pregnancy which makes them among the causes of the mortality and morbidity all over the world [2]. In the incidence of successful fertilization, reproduction and an early development of embryo begin in tubes of fallopian has a role to play in the events of physiology. There is an interaction before implantation between female reproductive system and the embryo. Transport of the embryo-tube is carried out with the beats of tubal ciliary and concentration of the smooth muscle. A theory also forwards that tubal ectopic pregnancies are the result of embryo retention within fallopian tube because of an impaired transportation of the embryo-tube and tubal environment alterations which allows the occurrence of an early implantation [3]. Growth factors are produced in the tubal epithelial cells, cytokines and in the related unknown identity embryo trophic factors which also support the development of the embryo in vitro. It is stated that the non-balancing state in the toxic compounds production which includes lipid peroxidase, oxygen-based free radicals, scavenging and detoxification of these damaging molecules in vivo may affect pre-implantation of the development of the embryo [4]. Theory also states that nitric oxide pathologic generation with the nitric oxide synthases increase in the production of the isoforms may reduce the beats of tubal ciliary and concentration of the smooth muscle; thus, it affects the transport of the embryo, consequently resulting in the shape of tubal ectopic pregnancy [5].

Research was aimed at the determination of the serum prolidase and oxidative status activity in the tubal ectopic pregnancies and it also aimed at the observation of the link between the two.

PATIENTS AND METHODS:

Design of the research was cross-sectional which was carried out from October, 2016 to November, 2017 at Obstetrics & Gynecology Department (Services Hospital, Lahore) with sample size of forty healthy pregnant women. Measurement of the activity of prolidase serum was carried out through spectrophotometrically. We used total capacity of the antioxidant for the determination of the oxidative status. Analysis of the data was carried out with the help of SPSS.

We included the ectopic pregnancy cases which were identified through levels of serum -hCG and transvaginal USG. Full historical data and clinical assessment was documented in every ectopic pregnancy case. An informed consent was also secured before the commencement of the research. We did not include all the cases exhibiting additional illness, alcohol abuse, intravenous drugs intake, smoking cases and any related risk factors. The gestational age of the patients was in the range of 5 – 8 weeks.

Twenty-three cases were observed with level of the -hCG serum as (> 1500 IU/ml) and during the USG scan uterine cavity was empty or amass and cervical canal with USG appeared as an ectopic pregnancy having separate from ovary, adnexa and corpus luteum. Remaining seventeen cases experienced an evaluation of the serial_-hCG and USG assessment. Cutoff point was used as 66% increase in the time of forty-eight hours for viability with a threshold around (1500 IU/ml) of -hCG for intrauterine pregnancy [9, 10]. All the cases with low level of concentrations of -hCG were observed with a subnormal increase and they experienced diagnostic curettage and dilatation procedure. At pathology department material of the biopsy was formalin fixed (10%). Staining of the material of biopsy was carried out through hematoxylin-eosin and it was evaluated in the trophoblasts and chorionic villi absence. Confirmation of the ectopic pregnancy was made after the procedure of D&C. Control group comprised of the early pregnant cases. Controls were also selected through the same criteria and excluded with the same. Because of complications sample size was reduced from 51 – 42 subjects.

Overnight fasting blood samples were assessed after being collected in the sterilized tubes and storage at four degrees was carried out. Determination of the TAC was made through Erel method [11]. This method utilizes the hydroxyl radical known among the potent radicals. Calibration of the assay was carried out through hydrogen peroxide and outcomes were shown in (μmol H^2O^2 Equiv./L).

Expressing of the data was made in mean and SD and analysis of the data was carried out in SPSS. The comparisons
between parametric elements and non-parametric elements was carried out in the Independent samples T-test and Mann-Whitney U-test respectively. Significant p-value was taken as (< 0.05).

RESULTS:

In the ectopic pregnancies the total capacity of the antioxidant was observed as low in comparison to the healthy cases with p-value as (< 0.018); whereas, oxidative stress index, total oxidant status and prolidase activity was observed high with a significant p-value as (< 0.05).

Table – I compares the clinical and demographic data of ectopic pregnant cases. Both the groups had a non-significant relation regarding gestational age, maternal age, BMI and parity (P-value as > 0.05). Ectopic cases reflected low levels of TAC serum than the level as observed in the controls (P-value as < 0.018); whereas, prolidase activity, TOS and OSI were high than controls (P-value < 0.001, P-value < 0.008 & P-value <0.001) as shown in Table – II.

Table – I: Demographic and clinical characteristics of the study population.

Controls (42)	Subjects (40)	P-Value
Age, years 29.37 ± 5.70	29.29 ± 6.19	P > 0.05
BMI (Kg/m2) 24.50 ± 2.97	24.02 ± 2.87	P > 0.05
Gestational age(weeks) 6.02 ± 0.99	6.52 ± 1.29	P > 0.05
Parity 4.07 ± 3.16	4.14 ± 1.92	P > 0.05

Table – II: Prolidase activity, TOS, TAC and OSI in subjects and controls.

Subjects (40)	Controls (42)	P-Value
TAC (mmol Trolox equiv./l) 0.93 ± 0.18	1.03 ± 0.19	0.018
TOS (mmol H2O2 Equiv./L) 16.91 ± 4.97	14.39 ± 3.30	0.008
OSI (arbitrary unit) 1.89 ± 0.71	1.44 ± 0.45	0.001
Prolidase (U/l) 688.46 ± 37.98	630.43 ± 54.47	< 0,001

DISCUSSION:

In the cases of early pregnancy and emergency cases a serious threat is posed by the ectopic pregnancy. There is a common risk of the catastrophic hemorrhage and tubal rupture in the ectopic pregnancy cases. Central role is played by the oxidative stress in various disorders of pathophysiology including pregnancy related complications [17]. In the oxidative attack there is a production in reaction to this attack of the oxygen species in physiological and metabolic processes from the species of reactive oxygen. Balance is maintained through an antioxidant defensive system; balance can be disturbed, which may lead to an incidence of oxidative stress. Oxidative stress can be referred to a prooxidant-antioxidant balance alteration which may lead to damage.

These damaging effects can be controlled through numerous tissues with the help of a defensive system which is enzymic and non-enzymic by keeping a balance in the elimination and production of the various systems of antioxidant. Cellular damage may be the result of any critical balance shift. Oxidative damage extent is dependent on the oxygen balance and capacity of the endogenous antioxidant [18].

Prolidase is a ubiquitous enzyme which is important for the connective tissue metabolism, intracellular protein catabolism and matrix remodeling [19]. This activity is noticed in the leukocytes, erythrocytes, dermal fibroblasts, plasma, kidney, heart, brain, uterus and thymus [20]. Prolidase I & II are two forms of this enzyme with respective molecular weight of (105,000 & 151,000); whereas in the human plasma only prolidase-I is observed [21]. Most abundant protein is collagen which is comprised of more than fifty percent of the proteins in the human body [22]. The increase in prolidase activity of the enzyme is directly linked with the turnover of collagen and prolidase activity of the enzyme which may be affected by the oxidative stress [29]. So, events which are oxidatively stressful may cause injury to the cell and tissue, also includes enhancement of the protein like collagen causing an abnormal tuba uterine remolding. Collagen molecules and tubal epithelium may be attacked by the reactive oxygen species generating systems. So, prolidase activity may be increased through an enhanced oxidative stress. It may also play a role for the tubal epithelium and tubal milieu changes. It may also be replaced by collagen fibers. We may also see the incidence of tubal ectopic pregnancy in the absence

of any associated known risk factors. Prolidase role in collagen metabolism is reflected through pathological conditions which include uterine leiomyoma and liver cirrhosis [14, 25].

Our research observed an increase in the activity of the serum prolidase in tubal ectopic pregnant cases that can be translated as elevated collagen resync thesis. We may also relate tubal ectopic pregnancy with an increase in the oxidative stress and increase in the activity of the serum prolidase. Better understanding of the ectopic pregnancy can be obtained through activity of the prolidase. We hypothesized that prolidase activity and oxidative stress are associated to the incidence of the tubal ectopic pregnancy. No literature was available in the English language articles of prolidase activity, oxidative stress and ectopic pregnancy. Our research is unique in its subject and setting including its methods and patients as it assesses the link between prolidase activity, oxidative stress and ectopic pregnancy. We observed in our research that OSI and TOS are increased as the decreased TAC level was observed in the cases of ectopic pregnancy and there is an increase in the prolidase activity in ectopic pregnancies than the healthy controls (pregnant cases). Hypothesis is backed by these outcomes.

CONCLUSION:

We may associate ectopic pregnancy with an increased activity of the serum prolidase and stress of the oxidative. We may correlate it for the provision of the better awareness of the ectopic pregnancy pathogenesis. More precise clinical investigations are required to observed the prolidase activity impact on the ectopic pregnancies.

REFERENCES:

1. Dart RG, Kaplan B, Varaklis K. Predictive value of history and physical examination in patients with suspected ectopic pregnancy. Ann Emerg Med 1999; 33: 283-90.
2. Paxton A, Maine D, Freedman L, Fry D, Lobis S: The evidence for emergency obstetric care. Int J Gynecol Obstet 2005; 88: 181-93.
3. Shaw JL, Dey SK, Critchley HO, Horne AW. Current knowledge of the etiology of human tubal ectopic pregnancy. Hum Reprod Update 2010; 16: 432-44.
4. Lopes AS, Lane M, Thompson JG. Oxygen consumption and ROS production are increased at the time of fertilization and cell cleavage in bovine zygotes. Hum Reprod 2010; 25: 2762-73.
5. Shao R, Zhang SX, Weijdegard B, Zou S, Egecioglu E, Norstrom A, et al. Nitric oxide synthases and tubal ectopic pregnancies induced by Chlamydia infection: basic and clinical insights. Mol Hum Reprod 2010; 16: 907-15.
6. Lupi A, Rossi A, Vaghi P, Gallanti A, Cetta G, Forlino A. Nbenzyloxy carbonyl-L-proline: an in vitro and in vivo inhibitor of prolidase. Biochim Bio phys Acta 2005; 1744: 157-63.
7. Miltyk W, Surazynski A, Kasprzak KS, Fivash MJ Jr, Buzard GS, Phang JM. Inhibition of prolidase activity by nickel causes decreased growth of proline auxotrophic CHO cells. J Cell Biochem 2005; 94: 1210-7.
8. Guerin P, Mouatassim S, Menezo Y. Oxidative stres and protection against reactive oxygen species in the pre-implantation embryo and its surroundings. Hum Reprod Update 2001; 7: 175-89.
9. Dart RG, Mitterando J, Dart LM. Rate of change of serial beta human chorionic gonadotropin values as a predictor of ectopic pregnancy in patients with indeterminate transvaginal ultrasound findings. Ann Emerg Med 1999; 34: 703-10.
10. Morin L, Van den Hof MC; Diagnostic Imaging Committee, Society of Obstetricians and Gynecology of Canada. Ultrasound evaluation of first trimester pregnancy complications. J Obstet Gynecol Can 2005; 27: 581-91.
11. Erel O. A novel automated method to measure total antioxidant response against potent free radical reactions. Clin Biochem 2004;37: 112-9.
12. Erel O. A new automated colorimetric method for measuring total oxidant status. Clin Biochem 2005; 38: 1103-11.
13. Harma M, Harma M, Erel O. Increased oxidative stress in patients with hydatidiform mole. Swiss Med Wkly 2003; 133: 563-6.
14. Myara I, Myara A, Mangeot M, Fabre M, Charpentier C, Lemonnier A. Plasma prolidase activity: a possible index of collagen catabolism in chronic liver disease. Clin Chem 1984; 30: 211-5.
15. Myara I, Charpentier C, Lemonnier A. Optimal conditions for prolidase assay by proline colorimetric determination: application to iminodipeptiduria. Clin Chim Acta 1982; 125: 193-205.
16. Chinard FP. Photometric estimation of proline and ornithine. J Biol Chem 1952; 199: 91-5.
17. Al-Gubory KH, Fowler PA, Garrel C. The roles of cellular reactive oxygen species, oxidative stress and antioxidants in pregnancy outcomes. Int J Biochemist Cell Biol 2010; 42: 1634-50.
18. Burton GJ, Jauniaux E. Oxidative stress. Best Pract Res Clin Obstet Gynaecol 2011; 25: 287-99.

19. Oono T, Yasutomi H, Ohhashi T, Kodama H, Arata J. Characterization of fibroblast-derived prolidase. The presence oftwo forms of prolidase. J Dermatol Sci 1990; 1: 319-24.
20. Zanaboni G, Dyne KM, Rossi A, Monafo V, Cetta G. Prolidase deficiency: biochemical study of erythrocyte and skin fibroblast prolidase activity in Italian patients. Haematologica 1994; 79: 13-8.
21. Cosson C, Myara I, Miech G, Moatti N, Lemonnier A. Only prolidase activity is present in human plasma. Int J Biochem 1992; 24: 427-32.
22. Di Lullo GA, Sweeney SM, Ko¨rkko J, Ala-Kokko L, D. San Antonio JD. Mapping the ligand-binding sites and disease-associated mutations on the most abundant protein in the human, type collagen. J Biol Chemist 2002; 277: 4223-31.
23. Lupi A, De Riso A, Torre SD, Rossi A, Campari E, Vilarinho L, et al. Characterization of a new PEPD allele causing prolidase deficiency in two unrelated patients: natural-occurrent mutations as a tool to investigate structure func. relationship. J Hum Genet 2004; 49: 500-6.
24. Altindag O, Erel O, Aksoy N, Selek S, Celik H, Karaoglanoglu M. Increased oxidative stress and its relation with collagenmetabolism in knee osteoarthritis. Rheumatol Int 2007; 27: 339-44.
25. Wolanska M, Sobolewski K, Drozdzewicz M. [Integrins and prolidase activity in uterine leiomyoma during tumor growth]. Ginekol Pol 2001; 72: 121-6.