Contents lists available at ScienceDirect

Asian Pacific Journal of Reproduction

Journal homepage: www.elsevier.com/locate/apjr

Document heading 10.1016/S2305-0500(13)60083-4

Live birth after assisted reproductive technology treatment in a case with lumboperitoneal shunt following intracranial pathology

Hikmet Hassa, Yunus Aydin, Fulya Taplamacioglu

Eskisehir Osmangazi University Medical Faculty, Obstetrics and Gynecology Department, Reproductive Medicine Unit, Eskisehir, Turkey

ARTICLE INFO

Article history:
Received 27 May 2012
Received in revised form 2 June 2012
Accepted 15 July 2012
Available online 20 September 2012

Keywords:
cerebrospinal fluid shunts
hypogonadism
reproductive techniques
assisted

ABSTRACT

Lumbar peritoneal shunt is a technique of cerebrospinal fluid diversion from the lumbar thecal sac to the peritoneal cavity. By diverting, a second compartment of the body; abdomen starts to accompany the case as a new problem source. 32 years old woman who had been considered to be primary infertile for fifteen years applied to our infertility clinic. She had a transsphenoidal surgery due to macroadenoma of pituitary gland fourteen years ago. By trans-vaginal ultrasonography we revealed 4 antral follicles and diffuse ascites in pouch of douglas due to the shunt. There were spicular projections fom uterus and bowel serosa to inner abdominal wall, that we thought about severe intraabdominal adhesions. Controlled ovarian hyperstimulation was started with 300 IU menotropin on third day of the cycle. We yielded 4 oocyte. One grade-1 embryo transferred at day two. After two weeks hCG positivity was determined. At 39th week 3 900 g female baby was born vaginaly with 1st minute apgar score as 9 and 5th minute apgar score as 10.

1. Introduction

Lumbar peritoneal (LP) shunt is a technique of cerebrospinal fluid (CSF) diversion from the lumbar thecal sac to the peritoneal cavity. It is indicated under a large number of conditions such as communicating hydrocephalus, idiopathic intracranial hypertension, normal pressure hydrocephalus, spinal and cranial CSF leaks, pseudomeningoceles, raised intracranial pressure following chronic meningitis, persistent bulging of craniotomy site after operations for intracranial tumors or head trauma. By diverting the cerebrospinal fluid, this method mostly increase patients long term survival and life quality[1,2]. However by shunting, a second compartment of the body; abdomen, starts to accompany the case as a source of new problem.

Incidence of abdominal complications is nearly 10-30% following LP shunt[3,4]. Intraabdominal visceral perforations, shunt migrations and intestinal obstructions are not rare But in young previously fertile female population most important ones are adhesions, infectious pseudocysts and non-infectious peritonitis[1]. And also the intracranial pathology commonly associated with dysfunction in the hypothalamic pituitary ovarian axis, resulting in amenorrhea an/or delayed puberty and infertility[5-7]. Consequently, patients mostly apply with hypogonadotrophic hypogonadism. So in existing infertility, it may be as a consequence of intracranial pathology or intraabdominal causes.

We are publishing an unique infertile hypogonadotrophic hypogonadism lumbar peritoneal shunt case resulting in live birth with the help of controlled ovarian hyperstimulation-ICSI.

2. Case report

A 32 years old woman who has been considered to be primary infertile for fifteen years applied to our

*Corresponding author: Yunus Aydin, MD, Eskisehir Osmangazi University Medical Faculty, Obstetrics and Gynecology Department, Reproductive Medicine Unit, Eskisehir, Turkey. Eskisehir Osmangazi Universitesi-Kadin Hastaliklarive Dogum ABD, 26000, Eskisehir, Turkey.
Tel: +90 222 2292002
Fax: +90 222 2393772
E-mail: aydin.yunus@yahoo.com

infertility clinic. She had a transsphenoidal surgery due to macroadenoma of pituitary gland fourteen years ago. She had underwent to a second operation five years after the first one for lumboperitoneal (L/P) shunt due to cranial base cerebrospinal fluid leakadge. Additionally she had 2 operations for L/P shunt revision. She was using levothyroxine sodium and cabergoline for hypothyrodism and hyperprolactinemia respectively due to pituiter surgeries. After these procedures she had ovulation induction-intrauterine insemination in another infertility clinic.

In the first evaluation in our clinic; she had a normal gynecological examination. By pelvic ultrasonographic examination, we revealed 3 antral follicles in right ovary, 1 antral follicle in left ovary and diffuse ascites in pouch of douglas due to the shunt. Uterus and endometrium was normal. However there were spicular projections fom uterus and bowel serosa to inner abdominal wall, that we thought about severe intraabdominal adhesions. Basal day 3 hormone profile levels were estradiol: 34.8 pg/mL, FSH: 0.72 IU/L, LH<0.10 IU/L prolactin 538 ng/mL. In office hysteroscopy no abnormality was detected. Neurosurgery department indicated that ovulation induction treatment and pregnancy would not expected to cause any disadvantages. Cabergoline 1.5 mg/week started for to decrease prolactin and the dosage increased upto 3.5 mg/week. After 4 month theraphy basal day 3 hormone profile levels were; estradiol: 25.3 pg/mL, FSH: 0.63 IU/L, LH<0.10 IU/L, prolactin 79 ng/mL.

Controlled ovarian hyperstimulation was started with hMG(human menopausal gonadotrophin) with 300 IU doses on third day of the cycle as usual in hypogonadotropic hypoganadism patients in our clinic. Dose of hMG was decreased to 225 IU on the tenth day of the cycle. We revealed one follicle with 17 mm, one follicle with 15 mm on the left ovary and one follicle with 16 mm, one follicle with 14 mm, and two follicles with 12 mm on the right ovary at twelfth day of cycle. Then hCG was administered and we planned OPU(oocyte pick-up) 35.5 h later. Total gonadotropin dosage that was used for stimulation was 3 150 IU.

We yielded 4 oocyte from ovaries. ICSI (intracytoplasmic sperm injection) was performed for three mature oocytes. Consequently three Z1 pronuclear stage zygote (Scott classification) developed on 18 h after insemination[8]. One grade-1 embryo transferred at day two. After two weeks hCG positivity was determined. Due to date of embryo transfer, 5 weeks and 5 d later we revealed a fetus by ultrasound examination with fetal cardiac activity and 17.3 mm fetal crown rump length. Subsequently on 39 th week of pregnancy she gave a healthy male baby with normal vaginal birth. His apgar scores were 9 at first minute and 10 at fith minute after birth. After birth there was no complication about the shunt of mother.

3. Discussion

There are large variety of indications beside hydrocephalus reasoned intracranial pressure increase for shunt procedures as ventriculoperitoneal shunt(VP) or lumbar peritoneal(LP) shunt[9]. One of the indications is CSF leakadge due to recurrent intracranial operations for pituitary macroadenomas as in our patient. Shunt procedure as VP or LP mostly indicated in those patients after intervention to main intracranial pathology. But by diverting cerebrospinal fluid to peritoneal cavity we mostly invite new sources of problems. Shunt infection remains a frequent and potentially fatal complication of CSF diversion, with a reported incidence of 5%-47%[10,11]. Peritoneal CSF pseudocyst formation is an unusual but also serious complication, with a reported incidence of less than 1.0%-4.5%[12,13]. On the other hand CSF loculation may present as recurrent ascites, a peritoneal cyst, an omental cyst, or subphrenic or lesser sac loculation[12]. In addition, cases of spontaneous CSF ascites have been associated with noninfectious peritonitis[14]. CSF caused intraabdominal reaction and/or infection will mostly pioneer chronic low grade inflammation and adhesion. Inflammatuar reaction to slicone material of tube mostly contribute the intraabdominal pathology. Due to infectious or non-infectious peritonitis, tuboperitoneal type infertility will probably develop. On the other hand, ovarian reserve may decrease as a result of peritonitis. Additionally increase in pregnancy complications such as first-second trimester miscarriages, preterm labor in patients with VP shunt reported[15]. And also multiple shunt revisions may be required due to shunt malfunction.

Hypogonadotrophic hypogonadism may accompany the female infertility case as a result of intracranial surgery or increased cranial pressure[16]. In general perspective, patients may have two main infertility factors: 1) hypogonadotrophic hypogonadism, 2) intraabdominal factors as tuboperitoneal factor infertility and chronic inflammation decreasing ovarian capacity.

In our case, patient had hypogonadotrophic hypogonadism beside other endocrine dysfunctions due to hypophyseal insufficiency. She was also taking treatments for hyperprolactinemia and thyroid dysfunction. We thougt that they were because of surgery performed 14 years ago, as it was nearly total hypophysectomy. This was the major part of infertility in our patient. We did not perform digonostic laparoscopy, but multiple spicular projections that also appeared by USG suggested severe

intraabdominal adhesions. Patient had no infectious signs about peritonitis or pseudocysts. But she may also had non-infectious peritonitis that causing severe adhesions resulted in tuboperitoneal dysfunction resulted with diminished ovarian capacity. Decreased basal antral follicle count as 4 and low number oocyte collected as also 4 suggested us that she may had decreased ovarian capacity.

According to us this is a unique case that; she had ART indication both for hypogonadotrophic hypogonadism and decreased ovarian reserve due to intracranial pathology with LP shunt, and also resulted in live birth without no pregnancy complications.

Conflict of interest statement

We declare that we have no conflict of interest.

References

[1] Howard Jr TE, Herrick CN. Pregnancy in patients with ventriculoperitoneal shunts: report of two cases. *Am J Obstet Gynecol* 1981; **141**: 99-101.

[2] Cusimano MD, Meffe FM, Gentili F, Sermer M. Management of pregnant women with cerebrospinal fluid shunts. *Pediatr Neurosurg* 1991; **17**: 10-13.

[3] Bryant MS, Bremer AM, Tepas JJ 3rd, Mol litt DL, Nquyen TQ, Talbert JL. Abdominal complications of ventriculoperitoneal shunts. Case reports and review of the literature. *Am Surg* 1988; **54**: 50-55.

[4] Agha FP, Amendola MA, Shirazi KK, Amendola BE, Chandler WF. Abdominal complications of ventriculoperitoneal shunts with emphasis on the role of imaging methods. *Surg Gynecol Obstet* 1983; **156**: 473-478.

[5] Lowry DW, Lowry DL, Berga SL, Adelson PD, Roberts MM. Secondary amenorrhea due to hydrocephalus treated with endoscopic ventriculocisternostomy. Case report. *J Neurosurg* 1996; **85**: 1148-1152.

[6] Phansey SA, Holtz GL, Tsai CC, Williamson HO. Chronic hydrocephalus and primary amenorrhea with partial deficiency of gonadotropin-releasing factor. *Fertil Steril* 1984; **42**: 137-139.

[7] Abdolvahabi RM, Mitchell JA, Diaz FG, McAllister 2nd JP. A brief review of the effects of chronic hydrocephalus on the gonadotropin releasing hormone system: implications for amenorrhea and precocious puberty. *Neurol Res* 2000; **22**: 123-126.

[8] Scott L. Analysis of fertilization. In: Gardner DK, Weissman A, Howles CM, Shoham Z, eds. *Textbook of Assisted Reproductive Technologies*, 3th ed, London: Informa Healthcare; 2009, p. 207-218.

[9] Yadav YR, Parihar V, Sinha M. Lumbar peritoneal shunt. *Neurol India* 2010; **58**: 179-184.

[10] Esposito C, Porreca A, Gangemi M, Garipoli V, De Pasquale M. The use of laparoscopy in the diagnosis and treatment of abdominal complications of ventriculoperitoneal shunts in children. *Pediatr Surg Int* 1998; **13**: 352-354.

[11] Lortat-Jacob S, Pierre-Kahn A, Renier D, Hirsch JF, Martelli H, Pellerin D. Abdominal complications of ventriculoperitoneal shunts in children: 65 cases. *Chir Pediatr* 1984; **25**: 17-21.

[12] Sharma AK, Pandey AK, Diyora BD, Mamidanna R, Sayal PP, Ingale HA. Abdominal CSF pseudocyst in a patient with ventriculo-peritoneal shunt. *Indian J Surg* 2004; **66**: 360-363.

[13] Oh A, Wildbrett P, Golub R, Yu LM, Goodrich J, Lee T. Laparoscopic repositioning of a ventriculoperitoneal catheter tip for a sterile abdominal cerebrospinal fluid (CSF) pseudocyst. *Surg Endosc* 2001; **15**: 518.

[14] White JB, Raffel C, Blackwell RE. A case of infertility in a patient with a ventriculoperitoneal shunt. *Pediatr Neurosurg* 2007; **43**: 146-148.

[15] Liakos AM, Bradley NK, Magram G, Muszynski C. Hydrocephalus and the reproductive health of women: the medical implications of maternal shunt dependency in 70 women and 138 pregnancies. *Neurol Res* 2000; **22**: 69-88.

[16] Bedaiwy MA, Fathalla MM, Shaaban OM, Ragab MH, Elbaba S, Luciano M, et al. Reproductive implications of endoscopic third ventriculostomy for the treatment of hydrocephalus. *Eur J Obstet Gynecol Reprod Biol* 2008; **140**: 55-60.