BÖLÜM 12

Semen Analizi

Ferhat CENGİZ [1]
Kemal ERTAŞ [2]

GİRİŞ

Erkek üreme hücresi olan sperm ilk olarak Anton Van Leewnhoek tarafından 1678 yılında mikroskopta görülmüş animalcules veya spermatikworms olarak tanımlanmıştır (Şekil-1-2) (1). Bilim adamlarının çoğu 1850 yılına kadar spermatozoayı parazit olarak tanımlamışlardır.1841 yılında Albert VonKolliker spermatozoanın parazit olmadığını testislerde üretilen hareketli otolog hücreler olduğunu belirtmiştir.Macomber ve Saunders 1929'da ilk kez insan semenini incelemiş ve gebelik için enaz 60 milyon sperm olması gerektiğini belirtmiştir (2). Dünya sağlık örgütü (WHO) 1980 yılında ilk kez insan semen analizlerinin standardize edilmesi için el kitabı yayınlamıştır.Referans aralıklarını belirlemek için üç kıta ve sekiş ülkede yakın zamanda baba olmuş erkeklerin semen verileri kullanılmıştır. El kitabı o zamandan beri birçok kez güncellenmiştir. Son 40 yıldır el kitabının evrensel standartları sağladığı anlaşılmış dünya ölçeğinde yaygın biçimde kullanılmaktadır.

[1] Embriyolog, Memorial Dicle Hastanesi Tüpbebek Laboratuvarı, ferhatcengiz@yahoo.com
[2] Op. Dr., Memorial Dicle Hastanesi Üroloji Bölümü, drertask@hotmail.com

Sperm Ultrastrüktür Değerlendirilmesi

Sperm motilitesi, diğer tüm motil hücrelerin silia yapılarında olduğu gibi kuyruk bölümünden 9+2 mimarisinde sağlıklı bir mikrotübül yapısına sahip olmasını gerektirir. İnsanlarda immotil silia sendromu vb. durumlarda olduğu gibi mikrotübül formasyonu bozulmuş ve motil sperm oranı düşmüş olabilmekte ancak bu hücreler metabolik olarak normal aktivite gösterebilmektedir. Dolasıyla semen analizinde motil sperm oranı %10 altında olan ancak vitalitesi normal olan infertil erkeklerde; sperm ultrastrüktür değerlendirilmesinin yapılması klinik olarak faydalı olduğu gösterilmiştir (6).

KAYNAKLAR

1. Clark GN.ART and history,1678-1978 Human Reprod 2006;1645-50
2. Taylor PJ, Martin RH. Semen analysis in theinvestigation of infertility. Can FamPhysician. 1981 Jan;27:113-6. PMID: 21289667; PMCID: PMC2305799.
3. Björndahl L, Kvist U. Sequence of ejaculationaffectsthespermatozoon as a carrieranditsmessage. ReprodBiomed Online. 2003 Oct-Nov;7 (4):440-8. doi: 10.1016/s1472-6483 (10)61888-3. PMID: 14656406.
4. Cooper TG. Cytoplasmicdroplets: thegood, thebadorjustconfusing? Hum Reprod. 2005 Jan;20 (1):9-11. doi: 10.1093/humrep/deh555. Epub 2004 Oct 7. PMID: 15471925.
5. CampbelWalshWeinUrology 12 edition
6. Gül Ü, TurunçT ve ark.Erkek Cinsel sağlığı ve fertilitesi2021;73-83
7. WHO laboratorymanualfortheexaminationandprocessing of human semen, Sixth Edition 2021
8. Niederberger, Craig S. "Semen andthecurse of cutoffs." *TheJournal of urology* vol. 185,2 (2011): 381-2. doi:10.1016/j.juro.2010.11.018
9. Schlegel, Peter N et al. "DiagnosisandTreatment of Infertility in Men: AUA/ASRM Guideline PART II." *TheJournal of urology* vol. 205,1 (2021): 44-51. doi:10.1097/JU.0000000000001520
10. Cooper, Trevor G et al. "World HealthOrganizationreferencevaluesforhuman semen characteristics." *Human reproductionupdate* vol. 16,3 (2010): 231-45. doi:10.1093/humupd/dmp048
11. De Jonge, Christopher et al. "Influence of theabstinenceperiod on human sperm quality." *Fertilityandsterility* vol. 82,1 (2004): 57-65. doi:10.1016/j.fertnstert.2004.03.014
12. Pound, Nicholas et al. "Duration of sexualarousalpredicts semen parametersformasturbatoryejaculates." *Physiology&behavior* vol. 76,4-5 (2002): 685-9. doi:10.1016/s0031-9384 (02)00803-x
13. Auger, J et al. "Decline in semen qualityamongfertile men in Paris duringthepast 20 years." *The New Englandjournal of medicine* vol. 332,5 (1995): 281-5. doi:10.1056/NEJM199502023320501
14. Dickerman, Z et al. "Andrologicalparameters in human semen of high (greaterthanorequalto 6 ml) andlow (lessthanorequalto 1 ml) volume." *Andrologia* vol. 21,4 (1989): 353-62.
15. Chemes, E Hector, and Y VanesaRawe. "Sperm pathology: a step beyonddescriptivemorphology. Origin, characterizationandfertilitypotential of abnormal sperm phenotypes in infertile men." *Human reproductionupdate* vol. 9,5 (2003): 405-28. doi:10.1093/humupd/dmg034

16. Correa-Pérez, Juan R et al. "Clinicalmanagement of men producingejaculatescharacterizedbyhighlevels of dead sperm andalteredseminalplasmafactorsconsistentwithepididymalnecrospermia." *Fertilityandsterility* vol. 81,4 (2004): 1148-50. doi:10.1016/j.fertnstert.2003.09.047
17. Kruger, T F et al. "New method of evaluating sperm morphologywithpredictivevalueforhuman in vitrofertilization." *Urology* vol. 30,3 (1987): 248-51. doi:10.1016/0090-4295 (87)90246-9
18. van der Merwe, F H et al. "Theuse of semen parameterstoidentifythesubfertilemale in the general population." *Gynecologicandobstetricinvestigation* vol. 59,2 (2005): 86-91. doi:10.1159/000082368
19. Agarwal, Ashok et al. "Oxidativestress in an assistedreproductivetechniquessetting." *Fertilityandsterility* vol. 86,3 (2006): 503-12. doi:10.1016/j.fertnstert.2006.02.088
20. Aktan, Gülşen et al. "Mystery of idiopathicmaleinfertility: is oxidativestress an actualrisk?" *Fertilityandsterility* vol. 99,5 (2013): 1211-5. doi:10.1016/j.fertnstert.2012.11.045
21. Jager, S et al. "A simplemethod of screeningforantispermantibodies in thehumanmale. Detection of spermatozoalsurfaceIgGwiththedirectmixedantiglobulinreactioncarriedout on untreatedfreshhuman semen." *International journal of fertility* vol. 23,1 (1978): 12-21.
22. Larsen, L et al. "Computer-assisted semen analysisparameters as predictorsforfertility of men fromthe general population. TheDanish First Pregnancy Planner Study Team." *Human reproduction (Oxford, England)* vol. 15,7 (2000): 1562-7. doi:10.1093/humrep/15.7.1562
23. Shibahara, Hiroaki et al. "Prediction of pregnancybyintrauterineinseminationusing CASA estimatesandstrictcriteria in patientswithmalefactorinfertility." *International journal of andrology* vol. 27,2 (2004): 63-8. doi:10.1111/j.0105-6263.2004.00437.x
24. Davis, R O, and D F Katz. "Computer-aided sperm analysis: technology at a crossroads." *Fertilityandsterility* vol. 59,5 (1993): 953-5. doi:10.1016/s0015-0282 (16)55909-3
25. Krause, W. "Thesignificance of computer-assisted semen analysis (CASA) fordiagnosis in andrologyandfertilityprognosis." *International journal of andrology* vol. 18 Suppl 2 (1995): 32-5.
26. Auger, J et al. "Sperm morphologicaldefectsrelatedtoenvironment, lifestyleandmedicalhistory of 1001 malepartners of pregnantwomenfromfourEuropeancities." *Human reproduction (Oxford, England)* vol. 16,12 (2001): 2710-7. doi:10.1093/humrep/16.12.2710
27. Jouannet, P et al. "Male factorsandthelikelihood of pregnancy in infertilecouples. I. Study of sperm characteristics." *International journal of andrology* vol. 11,5 (1988): 379-94. doi:10.1111/j.1365-2605.1988.tb01011.x
28. Aziz, N et al. "The sperm deformityindex: a reliablepredictor of theoutcome of oocytefertilization in vitro." *Fertilityandsterility* vol. 66,6 (1996): 1000-8. doi:10.1016/s0015-0282 (16)58697-x
29. Menkveld, R et al. "Semen parameters, including WHO andstrictcriteriamorphology, in a fertileandsubfertilepopulation: an efforttowardsstandardization of in-vivothresholds." *Human reproduction (Oxford, England)* vol. 16,6 (2001): 1165-71. doi:10.1093/humrep/16.6.1165
30. Menkveld, R et al. "Acrosomalmorphology as a novelcriterionformalefertilitydiagnosis: relationwithacrosinactivity, morphology (strictcriteria), andfertilization in vitro." *Fertilityandsterility* vol. 65,3 (1996): 637-44. doi:10.1016/s0015-0282 (16)58167-9
31. Agarwal, Ashok et al. "Reactiveoxygenspecies as an independent marker of malefactorinfertility." *Fertilityandsterility* vol. 86,4 (2006): 878-85. doi:10.1016/j.fertnstert.2006.02.111
32. Aitken, R John et al. "Oxidativestress in themalegermlineandits role in theaetiology of maleinfertilityandgeneticdisease." *Reproductivebiomedicine online* vol. 7,1 (2003): 65-70. doi:10.1016/s1472-6483 (10)61730-0

33. Desai, Nisarg et al. "Physiologicandpathologiclevels of reactiveoxygenspecies in neat semen of infertile men." *Fertilityandsterility* vol. 92,5 (2009): 1626-31. doi:10.1016/j.fertnstert.2008.08.109
34. Liu, D Y et al. "A human sperm-zona pellucidabinding test usingoocytesthatfailedtofertilize in vitro." *Fertilityandsterility* vol. 50,5 (1988): 782-8. doi:10.1016/s0015-0282 (16)60316-3
35. Liu, D Y et al. "Human sperm-zona pellucidabinding, sperm characteristicsand in-vitrofertilization." *Human reproduction (Oxford, England)* vol. 4,6 (1989): 696-701. doi: 10.1093/oxfordjournals.humrep.a136969
36. Liu, De Yi et al. "Normal rangeandvariation of the zona pellucida-inducedacrosomereaction in fertile men." *Fertilityandsterility* vol. 80,2 (2003): 384-9. doi:10.1016/s0015-0282 (03)00603-4
37. Franken, D R et al. "Hemizonaassayusing salt-storedhumanoocytes: evaluation of zona pellucidacapacityforbindinghumanspermatozoa." *Gamete research* vol. 22,1 (1989): 15-26. doi:10.1002/mrd.1120220103
38. Liu, De Yi, and H W Gordon Baker. "High frequency of defective sperm-zona pellucidainteraction in oligozoospermicinfertile men." *Human reproduction (Oxford, England)* vol. 19,2 (2004): 228-33. doi:10.1093/humrep/deh067
39. Franken, D R et al. "Physiologicalinduction of theacrosomereaction in human sperm: validation of a microassayusing minimal volumes of solubilized, homologous zona pellucida." *Journal of assistedreproductionandgenetics* vol. 17,3 (2000): 156-61. doi:10.1023/a:1009418222397
40. Liu, D Y, and H W Baker. "Morphology of spermatozoaboundtothe zona pellucida of humanoocytesthatfailedtofertilize in vitro." *Journal of reproductionandfertility* vol. 94,1 (1992): 71-84. doi:10.1530/jrf.0.0940071
41. Evenson, D P et al. "Characteristics of human sperm chromatinstructurefollowing an episode of influenzaandhighfever: a casestudy." *Journal of andrology* vol. 21,5 (2000): 739-46.
42. Huang, W J et al. "Germ-cellnondisjunction in testesbiopsies of men withidiopathicinfertility." *Americanjournal of humangenetics* vol. 64,6 (1999): 1638-45. doi:10.1086/302402
43. Sarrate, Zaida et al. "Role of sperm fluorescent in situhybridizationstudies in infertilepatients: indications, studyapproach, andclinicalrelevance." *Fertilityandsterility* vol. 93,6 (2010): 1892-902. doi:10.1016/j.fertnstert.2008.12.139
44. Kohn, Taylor P et al. "Geneticcounselingfor men withrecurrentpregnancylossorrecurrentimplantationfailureduetoabnormal sperm chromosomalaneuploidy." *Journal of assistedreproductionandgenetics* vol. 33,5 (2016): 571-576. doi:10.1007/s10815-016-0702-8
45. Ramasamy, Ranjith et al. "Fluorescence in situhybridizationdetectsincreased sperm aneuploidy in men withrecurrentpregnancyloss." *Fertilityandsterility* vol. 103,4 (2015): 906-909.e1. doi:10.1016/j.fertnstert.2015.01.029
46. Zidi-Jrah, Ines et al. "Relationshipbetween sperm aneuploidy, sperm DNA integrity, chromatinpackaging, traditional semen parameters, andrecurrentpregnancyloss." *Fertilityandsterility* vol. 105,1 (2016): 58-64. doi: 10.1016/j.fertnstert.2015.09.041
47. Zinaman, M J et al. "Semen qualityandhumanfertility: a prospectivestudywithhealthycouples." *Journal of andrology* vol. 21,1 (2000): 145-53.