

BAB 6

KESIMPULAN DAN SARAN

6.1. Kesimpulan

Pada penelitian ini didapatkan sampel sebanyak enam orang laki-laki dan enam orang perempuan yang rata-rata berusia 55 tahun. Diketahui rata-rata semuanya telah mengalami *diabetes mellitus* selama sembilan tahun. Frekuensi terapi oksigen hiperbarik yang diikuti oleh sampel adalah rata-rata sebanyak delapan sesi. Profil *BUN* sebelum terapi memiliki rata-rata sebesar 15,79 mg/dL sedangkan profil *BUN* sesudah terapi memiliki rata-rata sebesar 18,66 mg/dL. Untuk profil kreatinin serum sebelum terapi didapatkan rata-rata sebesar 0,99 mg/dL dan profil kreatinin serum sesudah terapi rata-rata sebesar 0,91 mg/dL. Profil sebelum maupun sesudah terapi tersebut masih berada pada batas nilai normal yang disarankan oleh Porth yaitu dalam rentang 8,0-20,0 mg/dL untuk *BUN* dan 0,6-1,2 mg/dL untuk kreatinin serum (12). Pada penelitian ini dilakukan uji t berpasangan terhadap profil *BUN* sebelum dan sesudah terapi yang menghasilkan nilai p sebesar 0,409. Sedangkan uji t berpasangan untuk profil kreatinin serum sebelum dan sesudah terapi menghasilkan nilai p sebesar 0,303. Keduanya memiliki nilai $p > 0,05$ yang dapat diartikan tidak bermakna secara statistik. Berdasarkan penilaian dari profil *BUN* dan profil kreatinin serum tersebut dapat disimpulkan bahwa terapi oksigen hiperbarik tidak mempengaruhi fungsi ginjal.

6.2. Saran

Untuk penelitian selanjutnya dapat dilakukan pemilihan sampel yang lebih spesifik yaitu pasien luka diabetik dengan indikasi nefropati diabetik seperti adanya proteinuria atau juga dapat digunakan indikator fungsi ginjal yang lebih spesifik seperti cystatin C dan inulin. Hal tersebut diharapkan dapat memberikan gambaran fungsi ginjal yang lebih signifikan. Jika masih menggunakan profil *blood urea nitrogen (BUN)* dan profil kreatinin serum sebagai indikator fungsi ginjal perlu diperhatikan lebih lanjut mengenai kondisi perancu seperti masalah asupan protein, perdarahan saluran cerna, dehidrasi, dan massa otot dari sampel. Bagi para pemegang kebijakan di bidang kesehatan yang terkait dapat dipertimbangkan mengenai bantuan pembiayaan terapi oksigen hiperbarik terhadap pasien yang kurang mampu secara keuangan. Dan yang terpenting adalah terus dilakukannya penelitian di bidang terapi oksigen hiperbarik secara berkelanjutan demi menggali seluruh potensi yang ada.

DAFTAR PUSTAKA

1. Mena NA, Sea EA, Lucia S. IDF Diabetes Atlas 6th edn. 2014 update. 2014; Available from: http://www.idf.org/sites/default/files/Atlas-poster-2014_EN.pdf
2. Achermann J, Bassuk S, Bhasin S, Bloomfield G, Bosl G, Bringhurst R, et al. Harrison's Endocrinology. 2nd ed. Fauci A, Kasper D, Longo D, Braunwald E, Hauser S, Jameson L, et al., editors. Chicago: The McGraw-Hill Companies, Inc.; 2010.
3. IDF. Diabetes and Foot Care – Put Feet First Prevent Amputations. Brussels; 2005.
4. Aguiree F, Brown A, Cho N, Dahlquist G. IDF Diabetes Atlas [Internet]. 2013. Available from: [#5\n\[http://hdl.handle.net/10536/DR O/DU:30060687\]\(http://dro.deakin.edu.au/view/DU:30060687\n<a href=\)](http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Diabetes+Atlas)
5. Guyton A, Hall J. Buku Ajar Fisiologi Kedokteran. 11th ed. Rachman L, Hartanto H, Novrianti A, Wulandari N, editors. Jakarta: EGC; 2006.
6. Wolf G, Müller N, Busch M, Eidner G, Kloos C, Hunger-Battefeld W, et al. Diabetic foot syndrome and renal function in type 1 and 2 diabetes mellitus show close association. *Nephrol Dial Transplant*. 2009;24(January):1896–901.
7. Margolis DJ, Hofstad O, Feldman HI. Association between renal failure and foot ulcer or lower-extremity amputation in patients with diabetes. *Diabetes Care*. 2008;31(7):1331–6.
8. Undersea and Hyperbaric Medical Society. Indications for Hyperbaric Oxygen Therapy [Internet]. 2015 [cited 2015 Feb 20]. Available from: <https://www.uhms.org/resources/hbo-indications.html>
9. Jain K. Textbook of Hyperbaric Medicine. 4th ed. Gottingen: Hogrefe & Huber; 2004.
10. Rubinstein I, Abassi Z, Milman F, Ovcharenko E, Coleman R, Winaver J, et al. Hyperbaric oxygen treatment improves GFR in rats with ischaemia/reperfusion renal injury: A possible role for the antioxidant/oxidant balance in the ischaemic kidney. *Nephrol Dial Transplant*. 2009;24(September 2008):428–36.
11. McPherson R, Pincus M. Henry's Clinical Diagnosis and Management by Laboratory Methods. 22nd ed. Philadelphia: Elsevier Saunders; 2011.
12. Porth C. Essentials of Pathophysiology. 3rd ed. Philadelphia: Wolters Kluwer Health | Lippincott Williams & Wilkins; 2011.

13. WHO. Diabetes Programme: About Diabetes - Introduction [Internet]. 2015 [cited 2015 Feb 23]. Available from: http://www.who.int/diabetes/action_online/basics/en/
14. Bender D, Botham K, Granner D, Keeley F, Kennelly P, Mayes P, et al. Biokimia Harper. 27th ed. Wulandari N, Leo R, Dwijayanthi L, Liena, Dany F, Rachman L, editors. Jakarta: EGC; 2006.
15. Albert D, Block A, Bruce B, Haines D, McCloskey L, Mitchell R, et al. Dorland's Illustrated Medical Dictionary. 32nd ed. Philadelphia: Elsevier Saunders; 2012.
16. WHO. Diabetes Programme: About Diabetes - Complications of Diabetes [Internet]. 2015 [cited 2015 Feb 26]. Available from: http://www.who.int/diabetes/action_online/basics/en/index3.html
17. Marshall SM. Recent advances in diabetic nephropathy. Postgrad Med J. 2004;80:624–33.
18. Gross J, De Azevedo M, Silveiro S, Canani L, Caramori M, Zelmanovitz T. Diabetic Nephropathy : Diagnosis , Prevention , and Treatment. Diabetes Care. 2005;28(January):176–88.
19. Takiyama Y, Haneda M. Hypoxia in diabetic kidneys. Biomed Res Int. 2014;2014.
20. Khanolkar MP, Bain SC, Stephens JW. The diabetic foot. Qjm. 2008;101(March):685–95.
21. Jain A. A new classification of diabetic foot complications: a simple and effective teaching tool. J Diabet Foot Complicat [Internet]. 2012;4(1):1–5. Available from: <http://jdfc.org/2012/volume-4-issue-1/a-new-classification-of-diabetic-foot-complications-a-simple-and-effective-teaching-tool/>
22. Kumar V, Abbas A, Fausto N. Robbins and Cotran Pathologic Basis of Disease. 7th ed. Philadelphia: Elsevier Saunders; 2005.
23. Giacco F, Brownlee M. Oxidative stress and diabetic complications. Circ Res. 2010;107:1058–70.
24. Forbes JM, Cooper ME. Mechanisms of diabetic complications. Physiol Rev [Internet]. 2013;93:137–88. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23303908>
25. Basta G, Schmidt AM, De Caterina R. Advanced glycation end products and vascular inflammation: Implications for accelerated atherosclerosis in diabetes. Cardiovasc Res. 2004;63:582–92.
26. Mathieu D. Handbook on Hyperbaric Medicine. Dordrecht: Springer; 2006.
27. Godman C a, Joshi R, Giardina C, Perdrizet G, Hightower LE. Hyperbaric oxygen treatment induces antioxidant gene expression. Aging, Cancer, Age-Related Dis

- Common Mech [Internet]. 2010;Annals of :178–83. Available from: <http://login.ezproxy.library.ualberta.ca/login?url=http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emed9&AN=2010319362\nhttp://resolver.library.ualberta.ca/resolver?sid=OVID:embase&id=pmid:&id=doi:10.1111/j.1749-6632.2009.05393.x&issn>
28. ETC. Multiplace Hyperbaric Chamber [Internet]. 2015 [cited 2015 Mar 14]. Available from: <http://www.etcaerospacesolutions.com/products/hyperbaric-chamber>
29. Amend W, Andersson K-E, Barbour S, Baskin L, Berger T, Carroll P, et al. Smith's General Urology. 17th ed. Tanagho E, McAninch J, editors. San Francisco: The McGraw-Hill Companies, Inc.; 2008.
30. Brisco M a., Coca SG, Chen J, Owens AT, McCauley BD, Kimmel SE, et al. Blood urea nitrogen/creatinine ratio identifies a high-risk but potentially reversible form of renal dysfunction in patients with decompensated heart failure. *Circ Hear Fail.* 2013;6(2):233–9.
31. Sastroasmoro S, Ismael S. Dasar-dasar Metodologi Penelitian Klinis. 5th ed. Jakarta: CV. Sagung Seto; 2014.
32. American Diabetes Association. Standards of Medical Care in Diabetes [Internet]. Diabetes Care. 2015. S1-S2 p. Available from: <http://care.diabetesjournals.org/cgi/doi/10.2337/dc15-S001>
33. Loutzenhiser R, Griffin K, Williamson G, Bidani A. Renal autoregulation: new perspectives regarding the protective and regulatory roles of the underlying mechanisms. *Am J Physiol Regul Integr Comp Physiol.* 2006;290(5):R1153–67.
34. Saweirs W. Diabetic Kidney Disease [Internet]. Website of the Edinburgh Renal Unit. 2010 [cited 2015 Oct 2]. Available from: <http://www.edren.org/pages/edreninfo/diabetic-kidney-disease.php>
35. Tongson L, Habawel DL, Evangelista R, Tan JL. Hyperbaric oxygen therapy as adjunctive treatment for diabetic foot ulcers. *Wounds Int.* 2013;4(4):8–12.
36. Augusto L, Albuquerque CD, Ferraz ÁAB. Original Article Preliminary results of hyperbaric oxygen therapy on patients on the waiting list for liver transplantation. 2011;24(1):48–51.
37. Waikar SS, Betensky R a., Emerson SC, Bonventre J V. Imperfect Gold Standards for Kidney Injury Biomarker Evaluation. *J Am Soc Nephrol.* 2012;23(1):13–21.
38. Parial R, Islam MM, Kasru A. Association of HbA1c , Creatinine and Lipid Profile in Patients with Diabetic Foot Ulcer. 2013;16(11):1508–11.
39. Li W, Wang R, Xie H, Zhang J, Jia Z. Changes of pathological and physiological indicators affecting drug metabolism in rats after acute exposure to high altitude. *Exp Ther Med [Internet].* 2014;98–104. Available from: <http://www.spandidos-publications.com/10.3892/etm.2014.2049>

40. Wyss M, Kaddurah-daouk R. Creatine and Creatinine Metabolism. Am Physiol Soc. 2000;80(3):1107–213.