Role of Erythropoietin in Pre-Renal Transplant Patients Undergoing Oral Surgical Procedures- Case Series

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Introduction

Oral cavity is called the "Gateway to the body "and dentist is often regarded as the "Gatekeepers of Health". Chronic kidney disease is an emerging disease with increased mortality in a low resource setting according to Global disease burden report (2015). [1] Due to lack of infrastructure and awareness among public most of the cases are diagnosed at a late stage which leads to increased mortality. In a parallel line, dentistry in developing countries still is a distant entity to the rural and suburban areas.

As a result of all these multitudinous factors, patients with end stage renal failure advised for renal transplant often visit to the dentist with poor oral hygiene and foci of infection which needs to be eliminated. This study highlights the importance of use of erythropoietin in oral and maxillofacial surgery. We present eight such cases of end stage renal failure planned for renal transplantation who visited to us for dental clearance without any perioperative complications.

Case 1

A 52 year old male patient presented with hypertension of 180/100 mmHg, signs of increased urination and pedal edema to the department of nephrology. He also has history of type-2 diabetes since 10 years and hypertension since 6 years. On examination, signs of diabetic nephropathy and retinopathy were present. His laboratory investigations showed abnormal electrolytes, increased serum urea and creatinine levels with hemoglobin level at 7 gm%, creatinine levels at 12.7 mg/dl, blood urea at 169 mg/dl with albuminuria. He was diagnosed with chronic kidney disease stage-5 without azotemia symptoms and planned for kidney transplantation. The patient was referred for dental clearance and fitness for surgery.

Oral and maxillofacial review was done for management of chronic generalized periodontitis indicated for full mouth extraction. Treatment plan was discussed both with the patient and nephrologist regarding intraoperative, post-operative healing period, time for intervention, medication. Erythropoietin 5000 IU was injected subcutaneously once in 5 days for 3weeks. Hemoglobin levels of 12 gm% was attained, surgical extractions were carried out successfully.

Case 2

42 year old male patient presented with hypertensive emergency to the department of nephrology with known history of hypertension from 8 years and diabetes from 2 years with signs and symptoms of pedal edema bilaterally with severe albuminuria. The case was diagnosed as chronic kidney disease stage 5 with indication for nephrectomy and for kidney transplantation. The case was referred for removal of periodontal compromised teeth prior to kidney transplantation. Hemoglobin levels of the patient were 8.2 gm/dl. Injection of erythropoietin 5000IU, SC once in 5 days for 2 weeks improved hemoglobin level.

Similar protocols were followed for all were carried out and managed without any complications and later on organ transplantation was done after 3 weeks.

Discussion

There is increased mortality in patients with chronic kidney disease having poor oral hygiene. In a study done by Sentonia C palmer [2], there was increased cardiovascular mortality in patients with chronic kidney disease having poor oral hygiene. There was longer survival in hemodialysis patients following oral hygiene practices. Patients with chronic kidney disease often need a dental referral to eliminate active infectious foci which may involve extraction of grossly decayed teeth/teeth with periodical pathology. These patients often present to us with decreased glomerular filtration rate, elevated creatinine levels and albuminuria. They also present with anemia (Hb<7) which needs to be addressed before proceeding for dental surgeries. Reduced levels of erythropoietin (produced by the kidney) leads to anemia that can cause relative hemodilution

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and unwanted bleeding. [3] Due to anemia and alteration in platelet aggregation there is increased risk of hemorrhage.

The role of erythropoietin as a hemopoietic agent in patients with chronic kidney disease was well documented in the literature. [4] According to a study done by [5], erythropoietin induces an elevation in Hb level by 2 mechanisms i) an increase in red cell volume ii) a decrease in plasma volume, which was hypothesized to be mediated by down regulation of Renin-angiotensin aldosterone axis. In the dental clinic setting, while treating patients with chronic kidney disease, erythropoietin plays a vital role as a haemostatic agent. Epoetin alfa transiently increases the number of circulating platelets thereby improves platelet function and return of the bleeding time towards normal. [6] Improvements in platelet aggregation were associated with improvement in the bleeding time. Injection of erythropoietin 5000 IU (SC) once in 5 days for 3weeks helped in increasing the hemoglobin by more than 70 percent in all the cases. There was less intraoperative bleeding during the dental extractions and minor oral surgical procedures and was managed by local haemostatic measures. There were also no reports of post-operative hemorrhage. [6]

Conclusion

Use of erythropoietin in patients undergoing minor oral surgical procedures with chronic kidney disease benefits the outcome and minimizes risk of both intra-operative and postoperative hemorrhage and opens scope for new research in oral and maxillofacial surgery. However, there is need for randomized controlled trials to explore its use in oral and maxillofacial surgery as a routine practice in chronic kidney disease patients.

References

1. Neuen BL, Chadban SJ, Demaio AR, Johnson DW, Perkovic V. Chronic kidney disease and the global NCDs agenda. BMJ Glob Health. 2017; 2:e000380.
2. Palmer SC, Ruospo M, Wong G, Craig JC, Petruzzi M, De Benedittis M, et al. Dental health and mortality in people with end-stage kidney disease treated with hemodialysis: a multinational cohort study. American Journal of Kidney Diseases. Am J Kid Dis. 2015; 66:666-676.
3. Pendem S, Narayana GL, Ravi P. End Stage Renal Disease: Not a Contraindication for Minor Oral Surgery Protocol for the Management of Oral Surgery patients with ESRD on Hemodialysis. J Maxillofac Oral Surg. 2017; 16:231-237.
4. Abed TS, Rasheed JI, Fawzi HA. Dosing of Erythropoietin Stimulating Agents in Patients on Hemodialysis: A Single-Center Study. Indian J Public Health. 2020; 11:1895.
5. Lundby C, Thomsen JJ, Boushel R, Koskolou M, Warberg J, Calbet JA, et al. Erythropoietin treatment elevates haemoglobin concentration by increasing red cell volume and depressing plasma volume. J Physiol. 2007;578:309-314.
6. Tang WW, Stead RA, Goodkin DA. Effects of epoetin alfa on hemostasis in chronic renal failure. Am J Nephrol. 1998; 18:263-273.