Acta Clin Croat 2005; 44:343-345 Professional Paper

HEMODIALYSIS ON THE ISLAND: FOUR-YEAR WORK OF DIALYSIS UNIT AT KORČULA HEALTH CENTER, KORČULA, CROATIA

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SUMMARY – Results of the four-year work of Dialysis Unit on the Croatian island of Korčula are presented. Before establishment of the Unit, patients had to travel a 400-km distance every other day to receive dialysis at the nearest dialysis units on the mainland. Due to specific island conditions, the construction and equipping of the Unit were technically more demanding. After four years of the work of the Unit, the number of permanent patients has increased by 40%, predominantly referring to the elderly. However, the favorable results of the work with patients were not accompanied by a positive financial effect. The development of health tourism represents the greatest chance for stable functioning of dialysis units on the islands.

Key words: *Dialysis; Island; Health centers; Croatia*

Introduction

The Croatian island of Korčula in the Adriatic Sea has about 17000 inhabitants in some ten settlements. Numerous tourists visit it during summer to enjoy the beautiful nature and unique cultural heritage mostly located in the medieval town of Korčula, also known as being the birth-place of the famous world traveller Marko Polo. The island is 48 km long and about 8 km wide. As the southernmost island of the Middle Dalmatia island group, it is situated to the southwest of the peninsula of Pelješac, with a 1200-m long strait between them[1]. The island of Korčula belongs to the most distant islands from the first hospital on the mainland.

The unsatisfactory traffic connection with the mainland, due to the great distance from the nearest hospitals in Dubrovnik and Split, and also the ever increasing requirements for medical care by the great number of tourists during the summer season, dictated the establishment of a health institution on the island with some characteristics of a hospital. As the result, the Korčula Health Center developed, along with primary health care, specialist services with some ten surgeries with a vision of creating some stationary activities, among them a dialysis unit.

Four years have elapsed since the Dialysis Unit at Korčula Health Center was established. Until then, patients with end-stage renal failure had to travel more than 400 km every other day to receive dialysis therapy in the nearest dialysis units on the mainland.

Construction and Technical Characteristics of the Unit

Outside experts and our staff made a feasibility study as the initial activity on establishing the Dialysis Unit. At that time, some eight to ten patients needed dialysis in the area. A rise by one new patient *per* year was anticipated, taking into consideration the existing number of inhabitants and the growth of elderly population on the island.

The fact that we live on an island with current difficulties in electricity and water supply implied an addi-

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Received April 25, 2005, accepted in revised form September 20, 2005

tional investment into backup energy and water facilities. Budgetary resources were approved for the planning, construction and equipment of the Unit, as it was part of the project entitled Improvement of Health Care Development on the Croatian Islands[2]. The Unit has been designed for a total area of 400 m^2 with 12 connecting sites for dialysis and completely separate premises for hepatitis positive patients. It has been so planned as to meet the requirements of modern tourist dialysis. Dialysis is performed on 14 Fresenius 4008 S (Fresenius Medical Care, Bad Homburg, Germany) devices, with the latest appliance for the preparation of water.

The water system includes a separate hydro-station with a large free-flowing tank in case of failure of the water supply from regional waterworks. Significant modifications were made in the town waterworks, in the broader area of the Health Center. Water piping for circular flow was constructed, improving the water purity and allowing for due supply from two directions. The problem of possible failure of electricity supply was resolved by purchasing a power unit and voltage adapter.

The Beginning of the Unit Work

Initially, hemodialysis (HD) was administered to ten permanent patients, nine from the island of Korčula and one patient from the peninsula of Pelješac. One physician, three nurses, a technician and a cleaning person are continuously attending the Unit. All emergency laboratory tests, radiologic and consultation services that may be needed in dialysis patients are available at the Center. Hematology and biochemistry analyses are done at the Center laboratory once a month.

In 2001, we began with dialysis therapy for ten patients, seven men and three women, median age 59 (range 34-76) years. Until then, they had been on dialysis treatment for a mean of 6.1±4.4 years. After four years, we have now proceeded with dialysis treatment for 14 patients, ten men and four women, median age 69 (range 38-84) years and mean duration of HD of 6.5±5.6 years. The underlying nephropathy types are chronic glomerulonephritis (n=5), nephrosclerosis (n=4), chronic pyelonephritis (n=3), diabetic nephropathy (n=1) and gout nephropathy with hypertension (n=1). Only one patient is hepatitis positive (HCV positive). The increase in the number of elderly patients was especially evident in the last year, when three new patients started HD therapy, median age 82 years. During these four years of the work of the Unit, two patients died: one during hospitalization for severe diabetes complications and one woman from very old age.

Results in Patient Care

All patients are dialyzed by conventional bicarbonate dialysis three times a week for 4-5 hours, using hollow fiber dialyzers with synthetic polysulfone membranes. The adequacy of dialysis is estimated every month by the calculation of Kt/V[3]. At the beginning of 2001, the mean Kt/V was 1.1±0.24. Now, the mean Kt/V of 1.3±0.26 has been recorded. After four years of dialysis at the Unit, the clinical and biochemical parameters point to better nutritional status of our patients. In 2001, the mean serum albumin was 36±3.1 g/L, whereas now it is 41±3.1 g/L ($t=3.1$; $p<0.05$).

Good results were also obtained in the management of chronic renal anemia. Only 50% of patients received erythropoietin when presenting to the Unit. They were mostly hypodosed at the mean hemoglobin level of 92 g/L. We managed to maintain their mean hemoglobin level at 112 g/L, therefore there was no need of blood transfusion.

As an outpatient institution, the Korčula Health Center has no possibility to establish a special department of transfusion medicine. Based on the current needs and experience acquired during the work of the war hospital in Korčula[4], we managed to create conditions to provide transfusion service for some especially urgent states in Korčula. We purchased a refrigerator for blood storage (Electrolux MRP 150, Stockholm, Sweden) and a mobile refrigerator (Electrolux MobilCooler RC 1500), to transfer ready-to-use blood products from the nearest hospital.

Temporary or permanent central venous catheter has been used as vascular approach in seven of our patients. No case of catheter infection has been recorded since the beginning of the work of our Unit, which we ascribe to the very strict measures of sterile work with catheters.

In 2001, 14 hospitalizations were required in our patients, 8 (57%) for the problems that had existed before their presentation to the Unit. These were mostly unsolvable problems of vascular approach. Thereafter, 6 hospitalizations were indicated in 2002, seven in 2003, and five in 2004. One hospitalization *per* year was indicated for placement or replacement of permanent central venous catheter due to catheter thrombosis. Three patients had to undergo interventions (PTCA with stent

insertion) on occluded arteries of lower extremities, whereas coronary stents were placed in a younger patient with unstable angina pectoris.

Patients with intercurrent complications who do not require hospital treatment but need stationary medical care are managed at our Health Center. These patients are not exposed to the exhausting transportation to hospital but continue their treatment near their home and family.

Two of our patients were on peritoneal dialysis, but they had to switch to HD due to repeated peritonitis even before presenting to the Unit. At the moment, none of our patients is on peritoneal dialysis.

Of 14 permanent patients, four patients, i.e. three men and one woman, mean age 43 (range 38-50) and mean duration of dialysis treatment of 6.5±3.6 years, are on the waiting list for cadaveric kidney transplantation.

None of our patients has been transplanted in the last three years. This is the consequence of the small number of kidney transplantations performed in Croatia. We also believe that such a state will improve, as there are some recent activities aimed at upgrading the national transplantation program[5].

Finances and Tourist Dialysis

Due to the present low price of HD in Croatia, a small unit like ours cannot work with positive financial results. This problem is even greater on an island because maintenance of the appliances is more expensive, and additional investment is necessary in servicing spare parts of energy sources. We see a real opportunity to achieve financial stability in the development of tourist dialysis. During each year, especially in summer months, we provided dialysis therapy to some ten patients, tourists from Croatia and Germany, although our Dialysis Unit can receive many more patients in tourist season. We anticipate that full development of tourist dialysis may be achieved when Croatia becomes full member of the European Union.

Acknowledgment

We would like to thank Professor Matko Marušić, Zagreb University School of Medicine, Zagreb, Croatia, for his valuable advice and help in writing the paper.

References

1. SMOLJANOVIĆ M, SMOLJANOVIĆ A, NEJAŠMIĆ I. Stanovništvo hrvatskih otoka. Split: Zavod za javno zdravstvo Županije splitsko- dalmatinske, 1999.
2. HEBRANG A *et al.* Poboljšanje zdravstvene zaštite na hrvatskim otocima. 2. radni skup - Zbornik izvješća. Zagreb: Ministry of Health of Republic of Croatia, 1998.
3. GOTCH FA, SARGENT GA. A mechanistic analysis of the National Cooperative Dialysis Study (NCDS). Kidney Int 1985;28:526-34.
4. PODBEVŠEK J, ŠALOV D, PODBEVŠEK D, MAROVIĆ M. Work of the Health Centre on the island of Korčula, Croatia, during the war isolation in 1991. Croatian Med J 1996;37:200-5.
5. Referentni Centar za transplantaciju Republike Hrvatske. Godišnje izvješće za 2002. Zagreb, May 2003.

Sažetak

Hemodijaliza na otoku: Četiri godine rada Centra za hemodijalizu Doma zdravlja u Korčuli

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U radu su prikazani rezultati četvorogodišnjeg rada Centra za hemodijalizu na otoku Korčuli. Sve do otvaranja Centra bolesnici s otoka morali su svakog drugog dana putovati iscrpljujućih 400 km do najbližega Centra za dijalizu na kopnu. Zbog posebnosti životnih uvjeta na otoku izgradnja i opremanje otočkoga Centra za hemodijalizu bili su specifični i zahtjevni. Nakon četiri godina rada broj bolesnika se je povećao za 40%, prvenstveno starih osoba. Dobri rezultati rada s bolesnicima nisu praćeni i očekivanim pozitivnim financijskim rezultatima. Stabilno funkcioniranje Centra u sadašnjim uvjetima može se ostvariti jedino razvojem dijalize za turiste.

Ključne riječi: *Dijaliza Otok; Domovi zdravlja; Hrvatska*