Can patients with significant renal artery stenosis who underwent renal angioplasty be monitored postprocedure in the general ward instead of the high dependency unit?

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INTRODUCTION: Renal angioplasty has been increasingly used to treat significant renal artery stenosis (RAS). At the Tan Tock Seng Hospital (Singapore), renal angioplasty patients are routinely admitted to the high dependency unit (HDU) postprocedure for monitoring.

METHODS: The complications of the RAS patients were reviewed postangioplasty, and it was determined whether the patients could be monitored in the general ward (GW) instead of the HDU. Cases of

patients with RAS of more than 50% who underwent angioplasty between January 1999 and September 2006 were reviewed retrospectively.

RESULTS: There were 35 patients with significant RAS who underwent angioplasty. Thirty were monitored in the HDU. Five were monitored in the GW because there were no HDU beds available. Patients in the GW were monitored every 30 min for 6 h, then every hour for 24 h. No immediate complications or deaths were recorded in the present series.

CONCLUSION: It may be safe and cost-effective to monitor patients with significant RAS postangioplasty in the GW.

Key Words: *Complications; General wards; High dependency unit; Renal artery stenosis; Stenting*

Renal artery stenosis (RAS) is a common, correctable cause of hypertension and renal impairment. In the general hypertensive population, the prevalence varies between 1% and 5% (1,2). This figure rises to between 10% and 45% in patients with acute, severe or refractory hypertension (3). The most common causes of RAS are atherosclerosis (90%) and fibromuscular dysplasia (8% to 9%) (2).

Treatment options for significant RAS are angioplasty, angioplasty with stenting, and bypass surgery. Angioplasty with stenting is the preferred method of treatment for atherosclerotic RAS (1-3). At the Tan Tock Seng Hospital (TTSH), Singapore, RAS patients with stenting are admitted to the high dependency unit (HDU) for close monitoring postangioplasty for 24 h.

METHODS

The objective of the present retrospective study was to review whether patients with significant RAS can be monitored postangioplasty in the general ward (GW) instead of the HDU.

Cases of patients with RAS who underwent angioplasty with stenting between January 1999 and September 2006 were analyzed retrospectively. Patients included were those with significant RAS of more than 50% who underwent renal artery angioplasty. Any immediate complications such as hypotension, local hematoma poststenting, arterial occlusion, dissection, vessel wall rupture, retroperitoneal hemorrhage and cholesterol

embolism were recorded. Contrast-induced nephropathy was defined as an increase in serum creatinine of more than 15% immediately poststenting. Creatinine usually rises 24 h to 48 h following contrast administration, peaks within three to five days and returns to baseline levels within seven to 10 days (4). This was also recorded in the present patient population. Reductions in antihypertensive medications were recorded in all patients.

RESULTS

Thirty-five patients with RAS presented to the TTSH within the study period. There were 24 Chinese patients, six Malay patients and five Indian patients. The mean age was 69.1 years (range 44 to 83 years). The ratio of men to women was 1.2:1. Fifteen patients were chronic smokers. The comorbidities and presentations of these patients are shown in Tables 1 and 2, respectively.

Five of the 35 patients were monitored in the GW because there were no HDU beds available. Patients in the GW were monitored every 30 min for 6 h, then every hour for 24 h. There were no immediate complications such as hypotension, local hematoma poststenting, arterial occlusion, dissection, vessel wall rupture, retroperitoneal hemorrhage, cholesterol embolism or death in the present series. In one patient, the atenolol dose was reduced from 50 mg to 25 mg in the HDU within 6 h of stenting.

Eight patients developed contrast-induced nephropathy, with increases in serum creatinine of more than 15%

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TABLE 1
Comorbidities in patients with renal artery stenosis

Comorbidities	n
Diabetes mellitus	15
No albuminuria	11
Microalbuminuria	1
Frank nephrotic syndrome	3
Ischemic heart disease	19
Cerebrovascular accident	11

TABLE 2
Presentations of patients with renal artery stenosis

Presentations	n
Severe hypertension with abnormal renal function	26
Severe hypertension with normal renal function	2
Flash pulmonary edema with hypertension	3
Worsening renal impairment at presentation with mild hypertension	4

TABLE 3
Complications postangioplasty and stenting

Data	Xue et al (5)	Kashyap et al (6)	Ethan et al (7)	Present study
Type of study	Retrospective	Retrospective	Meta-analysis	Retrospective
Patients, n	39	125	5378	35
Arteries undergoing intervention	45	—	—	46
Intimal dissection and perforation	3	6	5%	0
Femoral pseudoaneurysm	0	2	0	0
Excessive blood loss needing transfusion	1	0	Yes (% not reported)	0
Periprocedural non-Q MI	1	4	3%	0
Cerebrovascular accident	1	0	0	0
Nausea, vomiting	Common (numbers not specified)	0	Yes (% not reported)	Not reported
Local hematoma	Common (numbers not specified)	3	Yes (% not reported)	0
Renal function deterioration	0	0	1% to 13%	8 (6 patients in HDU, 2 in GW)
Restenosis	Not reported	10	10% to 21%	2 (in HDU)
Mortality in the first 30 days	0	2	3%	0
Patients hospitalized	6/39 (15%)	Not reported	Not reported	All
Uncomplicated procedure	No hospitalization; 2 h to 5 h of monitoring and observation with basic nursing care	Not reported	Not reported	All admitted even if procedure was uncomplicated
Unit	1 in HDU, 5 in GW, 33 in day care unit	Not reported	Not reported	30 in HDU, 5 in GW

GW General ward; HDU High dependency unit; MI Myocardial infarction

immediately poststenting. In four patients, the serum creatinine returned to baseline level at three months. In the other four patients, serum creatinine did not show improvement at three months, six months or one year. Of these four patients, three had diabetes mellitus with nephrotic-range proteinuria.

DISCUSSION

RAS is the major cause of renovascular hypertension. RAS is also increasingly recognized as the cause of chronic renal insufficiency and end-stage renal disease (2). Currently, there is little information on the unit in which these patients were monitored immediately postangioplasty with or without stenting. In one study (5), patients without complications were monitored in the day care unit for 2 h to 5 h with basic nursing care. If complications occurred during the procedure, they were admitted and monitored closely, with some of these patients monitored in the HDU. Other studies did not mention where patients were monitored postprocedure (6,7)

(Table 3). At the TTSH, patients with RAS poststenting are routinely sent to the HDU for close monitoring. These patients are observed for one day in the HDU and then transferred to the GW the next day.

Our study showed that there were no immediate complications postprocedure. RAS patients do not need to be monitored in the HDU. It is safe and cost-effective to monitor these patients with significant RAS postangioplasty and stenting in the GW. For uncomplicated cases, it may be appropriate to treat these patients as day surgery cases. Admission to the HDU for monitoring should be reserved for patients who develop complications during the procedure.

CONCLUSION

It may be safe and cost-effective to monitor patients with significant RAS postangioplasty in GW. However, more patients must be monitored closely in the GW to confirm the results of the present study.

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