Endovascular repair of thoracic aortic pathologies: Postoperative nursing implications

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Endovascular stent grafting is increasingly used to manage descending thoracic aortic pathologies. The procedure was introduced at the study hospital in 2001. We sought to examine the short-term clinical outcomes of patients who underwent this endovascular stent grafting, with the aim of using the result as baseline for development of an in-center clinical management protocol. We undertook a single-center, retrospective review of health care records of patients managed with thoracic stent grafts from 2001 to 2009. Patient characteristics, in-hospital data, and procedural data were obtained. SPSS was used to analyze the data. A total of 30 patients were treated with thoracic stent; 23 were male, 7 were female, and the mean age was 55.0. Aortic pathologies treated were traumatic aortic dissection/transection (n = 15), acute/chronic aortic dissection (n = 9), and degenerative aneurysms (n = 6). Endoleak occurred in 3 patients, with 1 requiring further endograft repair. Two patients underwent combined open and endovascular repair of acute thoracic aortic dissection; 1 died 4 days after the procedure, and the other developed stroke and acute renal failure not requiring dialysis. Of the 28 patients who underwent endovascular repair, paraplegia and paraparesis occurred in 2 patients but resolved with cerebrospinal fluid drainage. Stroke occurred in 1 patient. Patients who underwent combined procedure of open and endovascular repair of thoracic aortic dissection had a greater risk of developing major adverse events than patients who underwent endovascular repair alone (Fisher's exact test P = *.023). There was no association between the risk of stroke and the coverage of left subclavian artery in this series (*P = *.483). Graft stenting treatment for descending thoracic aortic pathologies has been shown to result in high in-hospital survival rates. It is essential for nurses who work in acute care settings to have knowledge of this procedure and potential complications associated with the procedure to enable postoperative assessment and immediate action if any deviation is observed.* (J Vasc Nurs 2014;32:63-69)

Endovascular stent grafting of the thoracic aorta was first reported in early 1990s by Dake and colleagues at Stanford University.[1–3] In searching for better clinical outcomes, and with the advancement in medical technology, the endovascular stent grafting is increasingly used to manage a range of thoracic aortic pathologies, such as acute and chronic type B dissection, traumatic thoracic aortic injuries, descending thoracic aortic aneurysms, and thoracoabdominal aortic aneurysms.[1] There are many advantages of endovascular intervention compared with a traditional open repair approach in managing the descending thoracic pathologic conditions, including decreased length of hospital stay and decreased perioperative mortality and morbidity.[4–7] It also offers a viable alternative for patients with multiple comorbidities, including advanced age, severe cardiac, and other multisystem limitations that otherwise are contraindications for conventional surgery.[3,8,9] Potential complications included, but are not limited to trauma to the access artery, embolic stroke, lower extremity embolism, endoleaks, postimplantation syndrome, bowel and renal ischemia, and spinal cord ischaemia.[9]

Neurologic deficit is among the most devastating postoperative complications of endovascular repair of descending thoracic aortic pathologies.

Endovascular repair of thoracic aortic pathologies was introduced to our center in 2001. Acute care nurses need to have knowledge and develop skills specific to endovascular treatment because they have to be prepared to manage such patients. In-hospital data have not been systematically analyzed and reported since the introduction of endovascular repair of descending thoracic aortic pathologies. We conducted a retrospective review of health care records of patients who underwent the thoracic endovascular intervention. The purpose of the study was to obtain short-term clinical outcomes of patients who underwent endovascular treatment of descending thoracic aortic pathologies, and to use the results as baseline for development of an in-center clinical management protocol. This article reports the study results and discusses implications relevant to postoperative nursing care.

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METHODS

Design and setting

We undertook a retrospective review of medical records of patients who underwent endovascular treatment of descending

TABLE 1

DEMOGRAPHICS (N = 30)

		Thoracic Aortic Pathologies	
Gender	*Total*	*Traumatic Injuries*	*Dissection and Degenerative Aneurysms*
Male (n)	23	9	14
Female (n)	7	6	1
Mean age (y)	55	40	65
Age range (y)	19-89	19-68	50-89

Emergency presentation: n = 18; elective, n = 6; transferred from other hospital, n = 6.

thoracic aortic pathologies at a large, tertiary, teaching and referral hospital from January 2001 to December 2009. The center is one of the major trauma hospitals in New South Wales.

Instrument

An audit tool was developed, and includes patient characteristics, presenting problem, medical background, access approaches, number of stents used, whether or not the left subclavian artery was covered intentionally, and major adverse events (MAE). For the purpose of this audit, MAE were considered to be those that resulted in major disability, for example, stroke; paraplegia or paraparesis; renal, cardiac, or respiratory failure; bowel or lower extremity ischemia; reoperation; and death within the same admission. The definition of acute dissection was restricted to newly diagnosed dissection within 2 weeks of the initial onsets of symptoms.

Data collection and analysis

Information was obtained from the hospital clinical information department, trauma registry, surgical audit database, and echo laboratory. The clinical nurse consultant conducted the audit and performed data entry. Each item and answers from the audit tool were coded, recoded, and entered into the computer program Statistical Package for Social Science (SPSS, version 19.0). The data were analyzed using descriptive and inferential statistics (chi square tests); significance was set at $P < .05$.

Ethical considerations

Ethics approval was obtained from the Human Research Ethics Committee, former Sydney South West Area Health Service as a quality assurance project. Health care records were reviewed and data identified by unique case identification number only, and no personal details were collected. All data obtained were collected by the investigator and handled confidentially, the data were stored in a secure place and could only be accessed by the investigator, and the data did not leave the hospital.

RESULTS

Patient characteristics

A total of 30 patients were treated with thoracic stent grafts between 2001 and 2009 at this center. There were 23 men (77%) and 7 women (23%), ranging in age from 19 to 89 (mean, 55). The youngest patient was a 19-year-old woman who had a severe closed head injury and traumatic aortic dissection, as the result of a high speed motor vehicle collision. The patients with traumatic aortic dissection were younger (mean age, 40 years) compared with the mean age of 65 years in the group with other aortic pathologies. Emergency presentation accounted for 60% (18/30) of the patient group, elective admission 20% (6/30), and 20% of patients were transferred from another hospital (Table 1).

Half of the patients (15/30) presented with traumatic dissection or transaction. Chronic and acute dissection accounted for 30% (9/30). Degenerative aneurysm was responsible for 20% (6/30). Vascular access was achieved percutaneously in 2 patients; in 28 direct operative cutdown was used.

Postoperative complications

Endoleak and access site complication. Three patients had endoleak demonstrated within 30 days of the procedure; one required further endografting. No intervention was needed for the other 2 patients. After 30 days postprocedure, another patients with endoleak was identified and underwent redoendovascular repair 7 months after the initial procedure. One patient had early (<30 days) access site complication (groin hematoma) that did not require further operative intervention.

MAE. Of 30 patients, 24 had no complications (Table 2). Two of the patients who underwent combined open and endovascular repair of thoracic aortic dissection had a greater risk of developing MAE than patients who underwent thoracic endovascular repair (TEVAR) alone in this review (Fisher's exact test; $P = .023$). One patient died and the other had a stroke. The patient who died was a 74-year-old man presenting with acute type A aortic dissection with tamponade. He underwent combined open and TEVAR of the dissection; fatal acute recurrent tamponade developed with cardiac arrest on postoperative day 4. Another patient