Effectiveness of a Designated Clinical Pathway for Rehabilitation of Geriatric Hip Fracture as Reviewed by Six Sigma Principle

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Introduction
The clinical outcome of Geriatric Hip fracture does not only depend on surgical management but also on the rehabilitation. Advance in surgical intervention allow early mobilization and further improvement is possible with utilization of a clinical pathway designed to enhance outcomes in a standardized, cost-effective manner in rehabilitation setting.

Objectives
To evaluate the impact of a designated clinical pathway for geriatric hip fracture using the six sigma principle to measure and compare the variability of the output of clinical process, competence, and effectiveness in terms of process capability index (a measurable composite output scale).

Methodology
From 2010 and 2014, we recruited 2041 operated hip fracture managed with a designated clinical pathway. Different functional scores carried out by PT (EMS and MFAC) and OT (MBI) were collected at admission and discharge. Length of stay was calculated through the difference between date of admission and discharge. Change of residency, if any, was also collected. Gender difference in each year was also investigated. Effectiveness of program is assessed by Process capability index (Cpk) were using 7 and 42 weeks as the upper and lower specification limits respectively.

Result
A total of 2041 hospitalized patients were collected, of which 69.7% were female.
Mean age was 82.3 over the 3 years, and the numbers of patients with age between 86 and 95 were increased significantly over the 3 years (p < 0.01). Slightly more than half of the patients had fractures at neck of femur. Mean length of stay was 22.70 days and 49.2% of patients stayed fewer than 21 days in year 2013. Both figures were similar over the 3 years. All scores recorded by PT (EMS and MFAC) and OT (MBI) showed significant improvements after hospitalization (admission vs. discharge, p<0.01 in all scores). There were significantly more patients originally stayed at home returned to their houses after discharge (2011 vs. 2013 = 52.8% vs. 60.5%), instead of moving to old age homes (OAH) (2011 vs. 2013 = 14.9% vs. 13.8%), or back to OAH where they were originally from (2011 vs. 2013 = 22.4% vs. 20.5%) (All: p<0.01). With a designated clinical pathway we found that Cpk values were increasing (improving) over the 5 years, particularly in female patients and patients with age between 75 and 84.