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A 10-year Review of Pelvic-acetabular Fracture Management and Its Modification Following Introduction of 3D-Navigation Guided Minimally Invasive Percutaneous Screw Fixation Technique (MIS) in a Trauma Center

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NAVIGATION

Introduction

The 3-in-1 Pelvic Damage Control Protocol for exsanguinating pelvic fracture had been implemented in our center since 2008. Significant improvement in survival rate of patients with unstable pelvic fracture was observed from 27% (with pelvic external fixation +/- angio-embolization before 2008) to 76.2% in 2015. This increased survival resulted in more definitive pelvic fixation including both open reduction internal fixation (ORIF) and x-ray guided MIS. 3D-navigation technique was therefore developed since October 2015 to facilitate pelvic-acetabular MIS to cope with the increasing demand and complexity of this challenging clinical condition.

Objectives

To observe the changes of pelvic fracture management and its short-term outcome after introduction of 3D-navigation guided MIS technique.

Methodology

All pelvic-acetabular fractures admitted to our center from 2007 (just before implementing 3-in-1 pelvic damage control protocol) to October 2016 indicated for surgery were reviewed.

Result

256 patients with pelvic-acetabular fractures were admitted to our center in this 10-year period. 83% survive the injury; 17% were treated conservatively; 20% received external fixation alone; 12% received x-ray guided MIS; 19% received ORIF (including 8 ilio-inguinal, 16 Kocher-Langenbeck, 18 Stoppa and 7 combined approach); 15% received 3D-navigation guided MIS.

The feasibility of MIS was assessed in navigation computer in all cases since October 2015 before considering ORIF or other surgical means. There is significant increase in proportion of MIS from 18 to 86% after the introduction of 3D-navigation technique (78% 3D-navigation guided MIS and 8% x-ray guided MIS) while that of

ORIF has decreased from 74% to 6%. Among the cases with 3D-navigation guided MIS, 58% required either open or close reduction to make MIS fixation feasible in displaced fracture.

The 3D-navigation guided MIS cases were compared to all ORIF cases. Major parameters such as patient's demographic, acute length of stay, intra-operative blood loss and operative time will be compared and updated.

With appropriate fracture reduction, MIS feasibility assessment and pre-operative planning in navigation computer, 3D-navigation guided MIS technique provides a good surgical alternative for most simple or complex pelvic-acetabular fracture, which could be beneficial to patients in terms of lesser surgical morbidities and better clinical outcome.