Research Article

DOI: 10.5455/2349-2902.isj20150518

"Open window" of the ilium iliac fossa took bone in the application of autologous bone graft

Qian Kun Gao, Wei Li, Min Dai*

The First Affiliated Hospital of Nanchang University, Nanchang, China

Received: 05 February 2015 **Revised:** 17 February 2015 **Accepted:** 22 March 2015

*Correspondence:

Dr. Min Dai,

E-mail: 774252454@qq.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Objective: To explore practical, simple, and less complications method of iliac cut.

Methods: A retrospective analysis of 23 patients with iliac bone taken between the June 2011 - June 2013. Using "windowed iliac fossa" to cut single or double cortex ilium, then count donor site complications and related factors.

Results: There is no abnormal appearance at the taken sit of the iliac, also there is no local pain or tenderness touch. The skin feeling of hip and thigh are normal, the VAS is 7-9, the department of belt are also unaffected.

Conclusions: As an improved method of bone taken in the autogenous bone graft, the complications of "windowed iliac fossa" decreased significantly than the traditional method, as a new methods of iliac cut, which is worth popularizing in clinical practice.

Keywords: Took bone iliac fossa, Bone transplant complications

INTRODUCTION

In recent years, the sound effects that various allogeneic bone, xenograft bone and artificial bone are used as bone graft material is becoming more effective. However, due to autogenous bone graft, including cortical and with excellent bone. organizational compatibility and non-immunogenic and including the characteristics of osteoconductive and osteoinductive are bettle than artificial bone, it is still considered to be "gold standard", 1-3 especially in iliac. Since the surgery of iliac bone graft is regraded as a small surgery, people tend to ignore the complications prevention. If the operation is misoperation, it will cause pain, nerve injury, paresthesia, hip hematoma, infection, wound dehiscence, scar iliac fracture and other complications, which will cause pain to the patient. 4-6 Current literature reported that it have achieved better results by improving method of iliac cut and the iliac bone defect prevention after the second

phase of reconstruction, avoiding complications. ^{7,8} In this paper, we discuss the surgery called "the 'open windowed' iliac crest bone graft" retains the iliac crest bone, reduces the incidence of donor site complications, and achieved a good clinical curative effect. It was reported now as follows.

METHODS

General information: Since 2012 December - 2014 June, there are 23 patients done the iliac crest bone graft surgery, aged 14-62 years old, average 39 years old. 14 cases due to nonunion or infected bone defect, ankle arthrodesis in ilium in 3, 4 cases were lesions shave their graft bone tumor, finger reconstruction take ilium in 2 cases. During operation iliac block are anterior superior iliac spine backward 2cm, retain the iliac crest is about 2-3 cm, iliac bone 2 cm x 1 cm x 1.5 cm to 2 cm x 1 cm x 1.5 cm.

Surgical methods: With the supine position, patients are adopted intraspinal anesthesia or general anesthesia. First, draping routine disinfection at the iliac crest and making a 3-6 cm length oblique incision along the iliac crest. Second, cut the skin and subcutaneous tissue in turn, separate the subcutaneous tissue gradually, isolate the subperiosteal from the ilium strictly. Finally, we take single or double cortical bone from the anterior superior iliac crest back 2 cm under the iliac crest at about 2-3 cm (Figure 1). Also, we use bone wax to stop bleeding by compression in the marrow cavity of the donor site. At last, we place drainage piece on the incision.

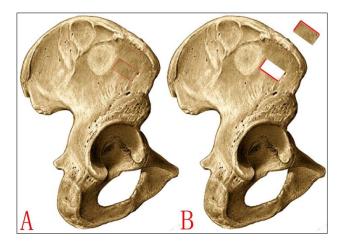


Figure 1: Iliac bone iliac fossa "open window" bone diagram.

Questionnaire: Using the method of visual analog scale (VAS) were followed up for patient satisfaction. To draw a 10 cm horizontal line above the paper, at one end horizontal line is 0, indicating no pain; another end 10, which means pain; the middle part represents the different degree of pain. Based on the patient's feeling, mark on the horizontal line to express the degree of the pain.

RESULTS

The operation incisions of iliac donor site and bone grafting are achieved the first grade healing. According to the 12-36 months followed up, average 18 months, we discover that the appearance of the ilium were normal, the part were no pain or tenderness and the hip and thigh skin feel without exception. According to the VAS questionnaire to survey of patient satisfaction, the average of the patient satisfaction is 8.6 (7-9), belt is unaffected.

DISCUSSION

Although autogenous iliac transplantation is the prevent treatment of bone defects, bone tumors, spinal fusion and joint bone surgery, but it is still considered as the "gold standard" bone grafts. However, the main disadvantages of this survey are donor site complications

and limit of bone.8 at present, to reduce donor site complications the main method is improved by iliac bone and allograft bone or artificial bone defect reconstruction for the district. The main methods of cut iliac are trephine cut method, the traditional "open window" cut method, "fence" cut method and conventional cutting method." The trephine cut method is cut down outside the iliac bone block by trephine after stripping iliac plate. The traditional "open window" cut method, stripping ilica inside or outside plate, apart from the iliac crest tissue 0.5-1.0 cm, use electric drill holes cut depending on the size and shape of the bone. The "fence" cut method should be defined as bellow: behind the anterior superior iliac spine 2 cm beyond, we cut the front and rear ends of the iliac crest of the target bone segment, according to the desired number of bone mass, we longitudinally split the lateral cortex with a bone knife, and transected the iliac under the iliac crest, then remove the ilium. When using conventional method, surgeons strip away of the internal and external iliac plate, directly cut through bone or piece of bone from the iliac with a bone knife. The conventional cut method is, stripping ilium internal and external plate, use osteotome to cut out directly from the iliac crest bone or piece of bone. Among these methods, the conventional method has a higher incidence of complications. The main complications were the lateral femoral cutaneous nerve damage, blood clots caused to the hip, the donor site pain, iliac crest bone pain, affect patients with belts, etc. Although, to reduce the donor site complications caused by bone defects, other methods are improved iliac cut method and achieve good clinical effect. However, the trephine cut method need special equipment and the size of the cut out bone and bone defect positions are inconsistency. The conventional "open window" method retained a narrow iliac crest is easily lead to fracture of ilium. The "fence" cut method is too complex to grasp.

First, the iliac crest is relatively hard part of ilium, this section damaged is likely to cause bound iliac fracture, especially when take the bone near the anterior superior iliac crest. Since the anterior superior iliac crest has inguinal ligament and Sartorius muscle, they are more likely to cause fracture under their stretch stress. Second, the iliac crest is usually a belt stress position, which often feels pain or discomfort when it defects. Then, this position is also the internal abdominal oblique attachment, after removed, the internal abdominal oblique has nowhere to attach, resulting in the abdominal wall weak zone likely to cause hernia.⁷ Therefore, In order to minimize the damage to the iliac crest shape integrity and hardness, we improved the conventional cut method, below the iliac crest 2-3 cm for the "open window" take bone. This method has the following advantages.

 The conventional anterior superior iliac spine bone cause patients can't normal belt, and iliac take bone avoid the occurrence of this phenomenon, iliac take bone has the little effect to the structure and stability of the ilium. We visit the patients after operation were satisfied and belt is not affected;

- Iliac fossa bone graft is taken in a plane, can take the bone also can take bone pieces, both cancellous bone and cortical bone, can satisfy the demand of clinical surgery;
- 3) We can peel subperiosteal in the surgery, less damage to structures of bone area, reducing the hemorrhage both in the, reducing the formation of hip hematoma.
- 4) For the retention of iliac crest is wide, there is little effect on anti-shearing force and compression force and good pelvic stability.

Although the iliac fossa take bone has many advantages, but this method also has certain deficiency. Firstly, the site of take bone is more deeper than the traditional methods, so the risk of bleeding may increasing. However we could reduce the possibility of bleeding by peel subperiosteal and stanch bleeding thoroughly during the operation. Secondly, it still exist defects after the surgery, which may cause the formulation of bone hernia which lead patients pain when they are standing. In this research, we didn't see the patient pain, it may related to that we take a small amount of bone, little donor site defects and soft tissue adhesions closed the donor site defect in the.

In brief, the iliac fossa "open window" bone as an autologous bone graft improved the removal of the bone method, it has shorter operative time, less blood loss, smaller surgical risk, provided more bone and the complications was significantly lower than in the traditional method of harvesting bone. Therefore this method is a new method which is deserved to be promoted in clinic application.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

 $institutional\ ethics\ committee$

REFERENCES

- Sawin PD, Traynelis VC, Menezes AH. A comparative analysis of fusion rates and donor-site morbidity for autogeneic rib and iliac crest bone grafts in posterior cervical fusions. J Neurosurg. 1998;88(2):255-65.
- 2. Sen MK, Miclau T. Autologous iliac crest bone graft: should it still be the gold standard for treating nonunions? Injury. 2007;38(Suppl 1):S75-80.
- 3. Rentsch C, Rentsch B, Scharnweber D, Zwipp H, Rammelt S. Bone substitute. Transplants and replacement materials--an update. Unfallchirurg. 2012;115(10):938-49.
- 4. Beirne JC, Barry HJ, Brady FA, Morris VB. Donor site morbidity of the anterior iliac crest following cancellous bone harvest. Int J Oral Maxillofac Surg. 1996;25(4):268-71.
- 5. Pollock R, Alcelik I, Bhatia C, Chuter G, Lingutla K, Budithi C, et al. Donor site morbidity following iliac crest bone harvesting for cervical fusion: a comparison between minimally invasive and open techniques. Eur Spine J. 2008;17(6):845-52.
- Kong CG, Park JB, Won YD, Daniel Riew K. Arteriovenous fistula of the superior gluteal artery as a complication of posterior iliac crest bone graft harvesting: 3D-CT angiography and arterial embolization. Eur Spine J. 2009;18(Suppl 2):250-3.
- 7. Younger EM, Chapman MW. Morbidity at bone graft donor sites. J Orthop Trauma. 1989;3(3):192-5.
- 8. Gil-Albarova J, Gil-Albarova R. Donor site reconstruction in iliac crest tricortical bone graft: surgical technique. Injury. 2012;43(6):953-6.
- 9. Kessler P, Thorwarth M, Bloch-Birkholz A, Nkenke E, Neukam FW. Harvesting of bone from the iliac crest--comparison of the anterior and posterior sites. Br J Oral Maxillofac Surg. 2005;43(1):51-6.

DOI: 10.5455/2349-2902.isj20150518

Cite this article as: Gao QK, Li W, Dai M. "Open window" of the ilium iliac fossa took bone in the application of autologous bone graft. Int Surg J 2015;2:218-20.