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Original article

Incidence, management and outcome assessment of post operative infection following single bundle and double bundle acl reconstruction

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ABSTRACT

Introduction: Post-operative infection is a dreadful complication of ACL reconstruction with gray zone over management guidelines. We aimed to establish commonest etiology, assess incidence of infection and effect on outcome, individually for single and double bundle ACL reconstruction techniques, so as to formulate appropriate management guidelines.

Methods: Our prospective study involved 1152 patients operated for ACL reconstruction (437– DBACL, 715– SBACL) from 2010–2013. Post-operative infection was diagnosed clinically supported by positive gram stain/ culture and increased cell count in knee aspirate. All patients were started on empirical antibiotics and arthroscopic lavage and debridement was done. Graft was retained if it was stable and intact. Data recorded at follow up was analysed statistically.

Results: In SBACL infection rate was 0.84% while in DBACL it was 2.52%. All patients with infection presented with pain, effusion, fever and increased WBC, ESR & CRP. Average time of presentation after the surgery was 2.27 weeks for DBACL and 2.16 weeks for SBACL. In both groups, S.aureus followed by S. epidermidis were commonest isolates. Patients were given IV antibiotics for 2 weeks and oral for further 4 weeks.

Discussion: Incidence of infection is higher with the double bundle technique, however, the functional outcome is not affected (p value 0.231). Joint aspirate is the gold standard diagnostic test for infection. CRP and ESR are the next dependable tests with high sensitivity but their specificity is low. A thorough debridement is necessary apart from recommended antibiotic cover of 2 weeks IV followed by 4 weeks oral antibiotics.

1. Introduction

The anterior cruciate ligament (ACL) is one of the most commonly injured ligament in the knee.[1] Presently arthroscopic reconstruction is the most preferred method for ACL tear. There have been a lot of controversies regarding double bundle vs single bundle technique for ACL reconstruction. Among the complications which affect the outcome after the ACL reconstruction surgery, post-operative infection is deemed to be one of the most dreadful. It not only causes chondrolysis but may also cause graft failure and arthrofibrosis of the joint. The incidence after the ACL reconstruction has been reported from 0.14% to 1.8%.[2] The most common organisms isolated are *Staphyloccus aureus* and *Staphyloccus epidermidis*.[3] However, there are no clear cut guidelines for the management and there is a lot of controversy regarding arthroscopic or open debridement, graft retention versus scarification of graft, retention versus removal of the implants, duration of intravenous or oral antibiotics.[2] The purpose of our study was to review (compare) the incidence, management and outcome of post-operative infection following arthroscopic single and double bundle ACL reconstruction so as to formulate an opinion regarding the common controversies. To the best of our knowledge, there is no study in literature that directly compares infection after Double bundle ACL reconstruction with Single bundle ACL reconstruction.

2. Material and methods

This was a prospective study which was conducted in a tertiary care hospital from 2010 to 2013. The study was approved by Institutional Review Board and Ethics committee. Ethical standards according to the Helsinki declaration of 1964 (and its later amendments) were conformed to. Informed consent was obtained

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from all patients. Total 1152 patients were operated for ACL reconstruction in our hospital from 2010 to 2013. Among these a double bundle ACL reconstruction (DBACL) was done in 437 patients and single bundle ACL reconstruction (SBACL) in remaining 715 patients. The double bundle technique was used in more active and athletic patients with good bone stock.

2.1. Surgical techniques: technical specifications

All cases were done under tourniquet control. In all the patients ipsilateral autogenous hamstring tendon grafts were used for ligament reconstruction. In double bundle reconstruction technique, 2 femoral and 2 tibial tunnels were made for anatomical reconstruction. In this femoral side fixation of AM bundle was done with Tight rope-RT or crosspin and PL bundle fixation was done with 1 bioscrew while tibial side fixation was done with 2 bioscrews. In single bundle technique the single femoral tunnel was fixed with Tight rope-RT or crosspin or bioscrew or RCI. Tibial fixation was done with RCI or bioscrew. Sutures were removed after 2 weeks.

2.2. Follow up and evaluation

Rehabilitation protocol followed was aimed at achieving full range of motion within first 6 weeks with strengthening and proprioception being the focus over next two to three months and allowing return to sport/heavy work by 6 months. Patients were followed up post operatively at 2 weeks, 6 weeks, 12 weeks and every 6 months thereafter and assessed clinically and radiologically. Post-operative infection was diagnosed clinically (fever, wound site erythema, any wound discharge, effusion and painful knee movements out of proportion to expect according to duration since surgery) and supported by positive gram stain/culture and increased cell count in the knee aspirate. Patients with superficial infection who responded well with oral antibiotics and regular wound care were excluded from the study. Any patient who was confirmed as post-operative infection following ACL reconstruction was subjected to haematological investigations including haemogram, ESR and CRP. All these patients were started on empirical antibiotics (usually Inj. Teichoplanin 400 mg 24hrly) after the knee was aspirated. Thorough arthroscopic lavage and debridement was done and the graft was retained if it was stable and intact. A synovial biopsy was also sent at this time. The antibiotics were suitably modified as per the culture report. The intravenous (IV) antibiotics were continued for 2 weeks and oral antibiotics were given for 4 weeks. The patients were followed every 3 weeks till knee was clinically silent and ESR and CRP returned to normal and thereafter every 6 months till possible. At every follow up patients were assessed clinically with Lachman test and Anterior drawer test and KT-1000 for stability and functional status was assessed as well with IKDC and Lysoholm scores.

3. Results

Patient specific details have been tabulated in Tables 1a and 1b. Of the 1152 (437 double bundle & 715 single bundle) patients operated, 17 patients (incidence of 0.01%) had post-op joint

Table 1a
Details of patients who had post-operative infection after double bundle ACL reconstruction.

S. NO.	AGE	COMORBIDITY	METHOD OF RECONSTRUCTION	DURATION (MINUTES)	TIME OF PRESENTATION AFTER SURGERY (Weeks)	BLOOD PICTURE	CULTURE	NO. OF PROCEDURE AFTER INFECTION	LYSHOLM SCORE (at three successive follow ups)	KT SIDE TO SIDE DIFFRENCE
1	32	Nil	3 BIO + 1 TR	40	2	WBC-12, ESR-32, CRP-29	STAPH. AUREUS	1	35, 60, 82	3.6
2	24	Nil	3 BIO + 1 TR	44	6	WBC-14, ESR-26, CRP-46	STAPH. AUREUS	1	55, 72, 88	2.4
3	36	Nil	3 BIO + 1 TR	65	3	WBC-11, ESR-42, CRP-56	STAPH. EPIDERMIDIS	1	28, 78, 92	1.8
4	19	Old history of Chest Tuberculosis (taken ATT for 6 months)	3 BIO + 1 TR	41	4	WBC-17, ESR-31, CRP-39	STAPH. AUREUS	1	42, 57, 70	3.2
5	28	Nil	3 BIO + 1 TR	52	1	WBC-10, ESR-29, CRP-70	NO ORGANISM FOUND	2	29, 58, 85	2.9
6	25	Nil	3 BIO + 1 TR	49	2	WBC-13, ESR-56, CRP-46	STAPH. EPIDERMIDIS	1	21, 74, 91	1.6
7	39	Diabetic (Sugar controlled prior to surgery)	3 BIO + 1 TR	46	1	WBC-10, ESR-42, CRP-52	PSEUDOMONAS	1	38, 79, 82	2.5
8	31	Nil	3 BIO + 1 TR	56	1	WBC-12, ESR-29, CRP-57	STAPH. AUREUS	2	42, 59, 78	3.1
9	27	Nil	3 BIO + 1 TR	47	1	WBC-16, ESR-57, CRP-67	STAPH. AUREUS	1	57, 78, 88	1.2
10	35	Nil	3 BIO + 1 TR	54	2	WBC-13, ESR-42, CRP-87	NO ORGANISM FOUND	1	62, 76, 84	2.7
11	22	Nil	3 BIO + 1 TR	55	2	WBC-14, ESR-33, CRP-48	STAPH. EPIDERMIDIS	1	6, 11, 12 56, 72, 87	2.8

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