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A Review on the Matrix-Associated Autologous Chondrocyte Implantation

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Abstract

The primary reason of this study was to survey the utilize of autologous chondrocyte implantation (ACI) strategies within the knee amid fnal decade, and the auxiliary points of the consider were to decide reoperation rates after ACI and to distinguish related chance factors. A retrospective cohort study from 2010–2020 was performed utilizing the Pearl Diver database. The database was questioned for the Current Procedural Phrasing (CPT) code for ACI performed in any knee location, counting the patellofemoral and tibiofemoral joints. Reoperations were characterized as interventional knee strategies or add up to knee arthroplasty after ACI. Reoperations were identifed utilizing CPT and Worldwide Classifcation of Infections codes. Univariate and multivariate calculated regression were utilized to identify risk factors for reoperation. There has been increasing utilize of ACI within the knee with diminished hazard of reoperation since 2017 and the presentation of matrix-associated autologous chondrocyte implantation. More seasoned age and tobacco utilize were predictors of expanded hazard of transformation to arthroplasty. Male sex was related with decreased risk of reoperation.

Introduction

A.ic la ca.ilage and o.eochond al / o nd of .he knee join a e common and can e l in c i ical .o men and knee d f nc ion. Pa. con ide ha e de ailed chond al inj ie in p.o 65% of knee a .he .ime of mp oma ic a.h o cop . O e .he nal fe/ decade , .he. ea men of a.ic la ca.ilage ab cond ha ad anced a helpf l ca.ilage . a egie , ch a a.ologo chond oc.e implan a ion (ACI) and o.eochond al a.o/allog a . an plan a ion , ha e been c ea ed. e ea l f e enc of a.ic la ca.ilage ge ie among all o.hopedic ge ie pe fo med i hin .he Join .oge he S a e ha been e al a ed a 5%, i h a la e inc emen in.he e emedial me hod ela i e .o me hod ch a chond opla . o mic of ac e [1-3]. Among e.o a i e ca.ilage . a egie , a p eci e e ie/ demon . a ed .ha .hi d-gene a ion o ma i/-a ocia ed a.ologo chond oc.e implan a ion (MACI) ha go.en .o be fa o ed in la e a long .ime i hin .he e.ing of f ll- hickne a.ic la ca.ilage ab cond of .he knee.9 e c en e a of MACI a in od ced mode a el a of la e i hin .he Uni ed S a e , i h No i hmen and Medica e Admini . a ion endo emen go.en in Decembe 2016. i ecen l app o ed embed o e a.ologo chond oc.e e ned on a po cine collagen memb ane and can be embedded i h a b and la ge imple p oce .han ea lie e a of ACI. ha e i ed ing a collagen /.

e nde .anding of complica ion and eope a ion i h e pec .o ACI/MACI i b and la ge con . ained. In na ional da aba e ponde a e ing pa.e n in a.ic la ca.ilage ge ie i hin .he Joined .oge he S a e , info ma ion f om pa ien i h ACI and o.eochond al a.o/allog a . an plan a ion a e a a le combined, in .hi a con . aining o capaci .o di ec l deciphe ACI .ili a ion a e [4-7]. Mo eo e , fe/ .. die ha e e/plo ed eope a ion a e a e ACI and .he chance a iable ela ed i h .hi pa.ic la p oced e in a la ge coho .of pa ien . Mo . e/i ing da a a e f om ingle-in .i .ion o a di a.icle / hich e/amine . die i h di e e de ni ion of di appoin men o c i ical eope a ion. Gene ali able da a on .he p edominance and indica o of eope a ion a e ACI i hin .he Uni ed S a e a e lacking.

e p ima ea on of .hi ponde a .o e al a e .he .ili e of ACI . a egie i hin .he knee d ing nal decade, and .he a/ilia poin of .he .hink abo . / e e .o decide eope a ion a e a e ACI and .o ecogni e ela ed ha a d a iable . We h po he i ed .ha .he e / ill be e en iall highe a e of ACI me hod pe fo med a e 2017 among .he common pop lace d e .o .he la e p e en a ion of MACI. Al o, gi en .he ela i e ea e of MACI compa ed .o i fo e nne , / e .oo h po he i ed .ha .he e / o ld be inc ea ed eope a ion a e among .he / hole m of pa ien / ho had ACI pe fo med a e 2017 ince of .he de e mina ion of mo e complica ed pa ien fo ca.ilage eclama ion ge [8].

Methods

Info ma ion / a e ied f om .he MA.h o da a e , / hich ma be a b e of o ghl 4 million pa ien i hin .he Sailo da a e . To be incl ded i hin .he con ide , pa ien e i ed a CPT code fo ACI (CPT-27412) in .hei eco d. e CPT inco po a e ACI p oced e fo inj ie in all compa .men of .he knee, co n ing .he pa ellofemo al and .ibiofemo al join . Pa ien eco d / e e e .ioned fo b e en in e en ional knee . a egie and add p.o knee a .h opla . (TKA). In e en ional knee me hod / e e cha ac e i ed a : in e en ional knee a .h o cop , o.eochond al a.og a , o.eochond al allog a , la age and / a .e fo di ea e, emo e bod emo al, no ec om , chond opla . , meni cal . an plan a ion, meni cec om , meni c epai , l i of a.achmen , d illing fo o.eochond i i di ecan , f on c cia e .endon emaking, mic of ac e, .all .ibial o.eo om , di .al femo al o.eo om , a .h o om i hin .he knee, colla e al and c cia e .endon epai / econ . c ion , e/ . a-/in a-a .ic la .endon ep od c ion , and open ep od c ion ge fo knee epa a ion[9-10]. CPT code 29870 / a .ili ed .o iden if pa ien / ho had an con ned diagno .ic knee a .h o copic me hod a e ACI. Diagno .ic knee a .h o copic . a egie / e e e/ cl ded f om .he in e .iga ion of in e en ional knee eope a ion p oced e .

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Ba eline cha ac e i. ic / e e collec ed fo . he e/pe imen al and con ol g o p . e da aba e / a e. ioned fo . a i. ic fac o . o compa e . he g o p , / hich incl ded age, Cha l on Como bidi File (CCI), e/ , . obacco . ili e, diabe e , and bod ma le (BMI) (Refe ence ec ion Table 2). e CCI co ld be a b oadl ed and app o ed adj . men inde/ . ha acco n fo m l iple como bidi ie . o ppl and b and la ge e al a ion of a pa ien ' heal h.16 A ie / a cla i ed a ha ing a medical como bidi (obe i , . obacco . ili e, o diabe e) if. he had a CPT o ICD diagno . ic code fo . he como bidi in . hei eco d / i hin . he 1 ea befo e o on . he ame da a . he ACI. ACI pe fo med be/ een 2017 2019 / a an addi ional a iable anal ed / i h e pec . o . / o- ea eope a ion in ni a ia e elap e. Chance a io (OR) and 95% ce . ain in e im (CI) / e e calc la ed f om . he ni a ia e calc la ed elap e anal i . Uni a ia e calc la ed elap e / a no pe fo med / hen . he e / e e le . han 11 pa ien fo a gi en eope a ion ince of e . ic ion of. he da aba e.

Discussion

In . hi la ge coho . of pa ien , / e / a ched a igni can inc ea e / i hin . he e e of ACI ince 2017. e e / a a c i ical dimini h in . he a e of 90-da and 2- ea eope a ion fo ACI pe fo med a e 2017 in pi e of. he ob e ed inc ea e in e amid. hi . ime. Pa ien cho en fo ACI a e 2017 / e e mo e likel . o be . o . and ha e medical como bidi ie b . , ho/ e e , le likel . o be . obacco moke . ACI pe fo med in 2017 2019 / e e ela ed / i h dec ea ed chance of a eope a ion in ide 2 ea ela i e . o . ho e pe fo med in 2014 2016. Wi hin . he / hole pop lace of pa ien / ho had ACI pe fo med, . he e / a a 90-da eope a ion a e of 2.24% and a b and la ge eope a ion a e of 30.4% / i h a no mal follo/ - p of 4.8 a long . ime. Mo e ea oned age and . obacco . ili e / e e ela ed / i h highe a e of change . o a . h opla . / i hin . he in gene al . ime a e ACI. Male e/ / a p edic i e of dimini hed likelihood of eope a ion fo all . a egie b . he . ime of nal follo/ - p.

In alignmen / i h o . heo and al o . o / ha had been gge . ed in a la e o de l e , / hich incl ded 708 pa ien , 9 o con ide fo nd a igni can p/ a d lan / i hin . he ea l a e of ACI p oced e pe fo med a e 2017 a compa ed . o p io ea . e e / a an inc ea e of agen a e b abo . 60% f om 2018 . o 2019. e e di co e ie a e likel . he e l of . he p e en a ion of la e implan inno a ion / hich came a o nd / i h . he No i hmen and Seda e O gani a ion endo emen of MACI in Decembe 2016. Compa ed . o ea lie e a of ACI, MACI incl de a ho . e and mo e ea anged implan a ion p epa e ince of. he coo dina e applica ion of chond oc . e . o. he la e and. he capaci . o ec e. he lm / i h b in . ick in . ead of e .

Conclusion

e e ha been e/panding . ili e of ACI in . he knee / i h dimini hed chance of eope a ion ince 2017 and . he p e en a ion of MACI. Olde age and . obacco . ili e / e e p edic o of e/panded chance of . an fo ma ion . o a . h opla . . Male e/ / a ela ed / i h dec ea ed chance of eope a ion.

Conflict of Interest

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