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RESEARCH ARTICLE

THE IMPACT OF LONG-TERM FOLLOW-UP ON TOTAL HIP ARTHROPLASTY: A SYSTEMATIC REVIEW

Ali H. Al Asmri and Basil M. Al Rajhi
MBBS, Medical Resident at Saudi Board of Orthopedic Surgery, Jeddah, Saudi Arabia.

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Abstract

Total hip arthroplasty (THA) is a highly effective procedure, however national registries show that the average age has decreased and that younger patients are more likely to require revision. Long-term THA follow-up has traditionally been suggested to detect aseptically failing THA and reduce the dangers associated with significant modifications; however follow-up services are presently in decline. To assess the influence of long-term follow-up on total hip arthroplasty, a systematic review was done. The study was registered with the PROSPERO International Prospective Register of Systematic Reviews and followed PRISMA principles; databases included MEDLINE and Embase, and all studies were evaluated for quality. From 2009 to 2020, original research was conducted on the follow-up of persons with THA. 4,137 papers were reviewed for eligibility; 30 studies were included in the final analysis, representing 25 nations throughout the world. The study endpoint, patient details, loss to follow-up, revisions, ratings, and radiographic analyses were all retrieved. Total hip arthroplasty patients had a worse long-term self-reported physical quality of life and hip functioning than untreated patients with advanced hip osteoarthritis, although they nevertheless perform better physically. The amount of post-surgical satisfaction, on the other hand, is very high.

Introduction:-

Hip osteoarthritis (OA) is a painful and disabling condition that can be effectively treated with a complete hip replacement (THA). Total hip arthroplasty is an orthopedic operation that involves surgically removing the acetabular cartilage and subchondral bone, as well as the head and proximal neck of the femur [(1)]. In the proximal medullary area of the femur, an artificial canal is formed, and a metal femoral prosthesis with a stem and small-diameter head is put into the femoral medullary canal. The expanded acetabular gap is proximally filled with an acetabular component made of a high-molecular-weight polyethylene articulating surface[(2)]. These total hip arthroplasty components must be firmly secured to the bone, either with polymethylmethacrylate cement or, in more modern uncemented designs, by bony ingrowth into a porous covering on the implant, resulting in "biologic" fixation, in order to give effective outcomes. Total hip arthroplasty is one of the most often done orthopedic surgeries nowadays [(3)].

Total hip arthroplasty (THA) is a low-cost surgical procedure that can give considerable pain relief as well as improved physical performance. THA outcomes have typically been evaluated based on mortality rates, surgical and

Corresponding Author:- Ali H. Al Asmri
Address:- MBBS, Medical Resident at Saudi Board of Orthopedic Surgery, Jeddah, Saudi Arabia.

technical factors, survival rates, and the treating surgeon's evaluation. Patient-reported health outcomes, including as pain alleviation, joint function, health-related quality of life, and patient satisfaction following THA, have become more common in recent years. Aside from these considerations, it's critical to examine physical functioning because physical limits are linked to OA and THA [(4)].These restrictions are also linked to a lower quality of life, a higher chance of disability or depression, and higher health-care expenses. Furthermore, today's patients (who are often younger and more active than those who have previously undergone this surgical operation) have high expectations for functional outcomes following THA. An essential aim of surgery for many patients is the capacity to recover to a better degree of physical functioning. However, there is frequently a misalignment between patients' and surgeons' expectations. As a result, patients must be properly educated about the possibility of physical rehabilitation following THA [(5)].

There is a scarcity of evidence on the long-term effectiveness of THA operations as measured by these approved methods. Even little is known regarding probable determinants of these operations' long-term results. Traditional standards, developed by professional orthopaedicorganisations, urge that these patients be followed up on in the mid to long term in order to offer continued treatment. The word 'longterm' refers to a period of more than ten years (midterm, more than five years) during which an examination of the joint construct and symptoms may reveal any potentially harmful alterations, particularly asymptomatic ones, and determine the necessity for modification [(6)].Damage restriction and preoperative planning can help to enhance the experience and outcomes of revision surgery. The demand for long-term follow-up of components with an Orthopaedic Date Evaluation Panel rating, patient expectations, and financial limits on numerous health services are all factors at the moment. The study's goal was to perform a comprehensive evaluation of the literature to assess the impact of long-term follow-up and cost-effectiveness for revision total hip arthroplasty patients [(7)].

Materials And Methods:-

The systematic review was registered with PROSPERO, the International Prospective Register of Systematic Reviews; the procedures were adopted from the Cochrane Handbook13, and it followed PRISMA principles, albeit it was not confined to randomized trials.

Inclusion and exclusion criteria

Adults with THA in place for more than seven years were the target demographic. Studies were considered if they reported any type of follow-up, surveillance, or review of persons with THA, whether in person, by questionnaire, or through virtual techniques. Studies that reported the invention of an outcomes instrument, a surgical, radiological, or pharmacological intervention, or subsequent data analysis were omitted.

Literature search

We looked through Ovid's MEDLINE, Embase, and PsycINFO databases, EBSCOhost's CINAHL database, the Cochrane Library, and abstracts from scientific events. A search of scientific literature published between 2009 and 2020 in the English language was conducted. Prospective or retrospective longitudinal studies, cross-sectional studies, and randomized trials were all classified as original research investigations. Where a previous study's report was available, the most current published article was obtained. The search method was created for MEDLINE, however the phrases were modified to work in other databases.

Study selection

Before going to the full text, reviewers examined titles and abstracts for eligibility; disagreements amongst reviewers were addressed through discussion based on full text articles.

Data extraction

All saved search records were downloaded into Refworks (ProQuest L.L.C.) and then transferred to a Microsoft Excel spreadsheet for categorizing and inclusion/exclusion determinations. Study details and period, setting and country, assessment of study endpoint, method of statistical analysis, number and age of patients, loss to follow-up, number of revisions, outcome scores and radiographic analysis, reports of asymptomatic loosening of THA, and any reports of costs or cost-effectiveness were all included in a second spreadsheet for data extraction. Following the registration in PROSPERO, a secondary technique was used to collect text and opinions related to the study issue, as early stages of our evaluation revealed a scarcity of studies that directly assessed follow-up services.

Data statistic

Given the a priori assumption of diverse treatment effects among trials, a random effects meta-analysis model was used for all outcomes. The number of patients or hips in the denominator was modified as needed. The mean difference between groups was the reported statistic for continuous data provided on the same scale. For continuous data provided on multiple scales, the standardized mean difference (SMD) was utilized.

Results:-

Identification records obtained by database searching (N=1260), additional records obtained through other sources (N = 26). The screening Records (N=923) after duplicates were deleted. Records were screened (N = 923) and excluded (N = 336). Full-text articles for eligibility (N = 76), full-text articles omitted (N = 46). (n =30) studies were included in the qualitative andquantitative synthesis as showed in figure (1).

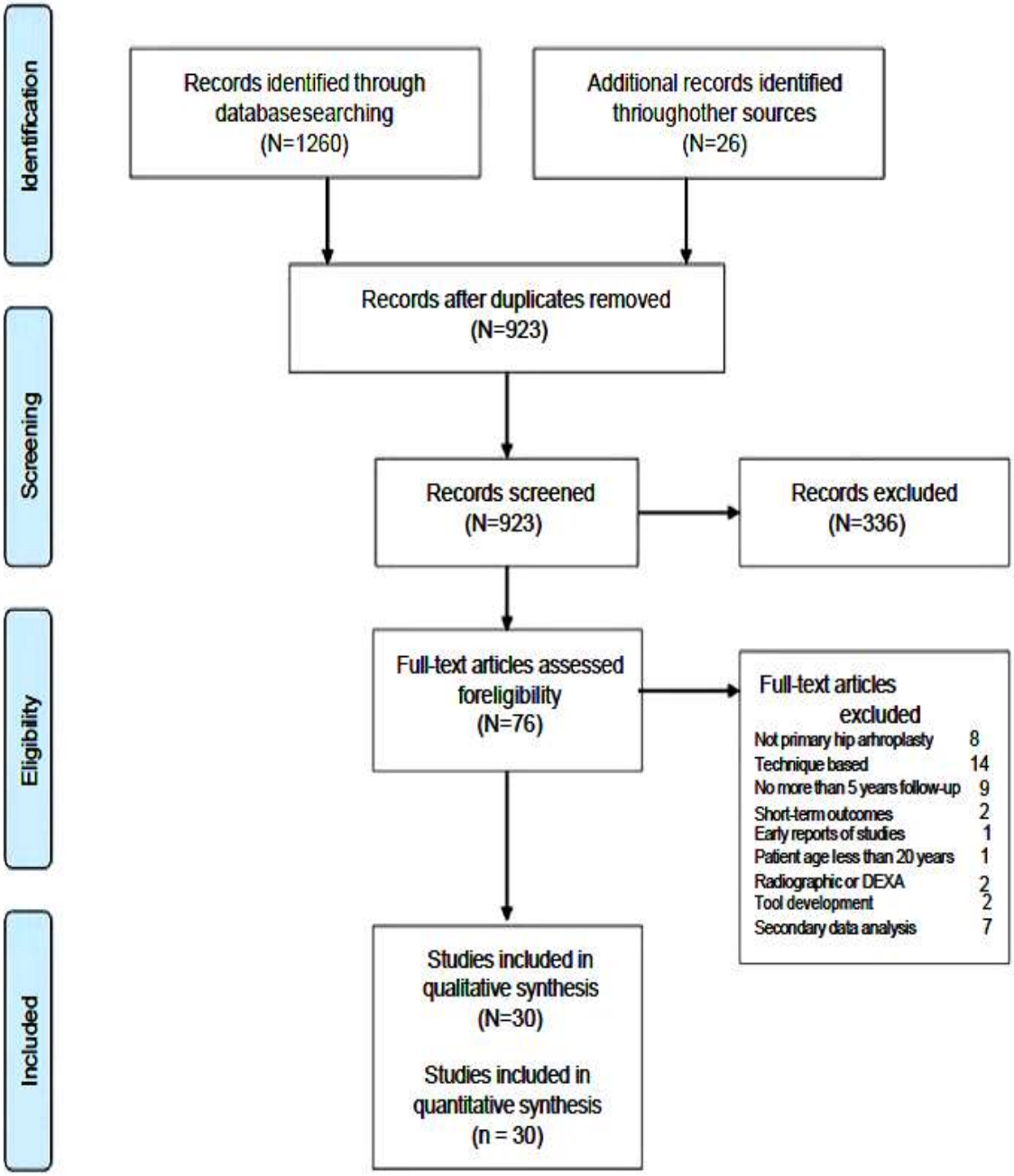

Figure (1):- PRISMA study flow diagram.

Table 1:- Study and patient characteristics.

S/N	Study	StudyDesign	TreatmentPeriod	Follow-UpDuration(d)[a]	Learning CasesIncluded
1. 1	Barrett(2013)[8]	RCT	2010-2011	90	No
2.	Bergin(2011)[9]	PN	e	28	No
3.	Cheng(2017)[10]	RCT	2014-2015	84	No
4.	Christensen(2015)[11]	RCT	e	42	No
5.	Engdal (2017)[12]	PN	2011-2013	8	Not specified
6.	Luo (2016)[13]	RCT	2014	30	No
7.	Petis (2016)[14]	PN	e	90	No
8.	Poehling-Monaghan (2017)[15]	PN	2013-2014	63	No
9.	Rodriguez (2014)[16]	PN	2010	84	No
10.	Taunton (2014) [17]	RCT	2012	42	No
11.	Zhang (2006) [18]	RCT	2002-2004	90	Not specified
12.	Zhao (2017) [19]	RCT	2015-2016	90	No
13.	**Balasubramaniam**etal. 2016[20]	RN	2006–2011	No	Yes
14.	Barrettet al.2013[21]	RCT	2010–2011	Yes	No
15.	Batailleret al.2017[22]	RN	2013–2015	Yes	Yes
16.	Fransenetal.2016[23]	RN	2012	Yes	Yes
17.	Luoet al.2016[24]	RCT	2014	Yes	No
18.	Maleket al.2016[25]	RN	2010–2014	Yes	No
19.	Newmanetal.2016[26]	RN	–	NR	NR
20.	Rathodet al.2014[27]	RN	2007–2011	No	No
21.	Rodriguez et al.2014[28]	PN	2010	Yes	No
22.	Suganoet al.2009[29]	RN	2005–2007	No	NR
23.	Tauntonetal.2014[30]	RCT	2012	Yes	No
24.	Tripuraneni etal.2016[31]	RN	2012–2015	Yes	Yes
25.	TsukadaandWakui2015[32]	RN	2000–2009	No	NR
26.	Watts et al. 2015 [33]	RNRCT	2010–2014	Yes	NRNR
27.	Amlieet al.2014[34]	RN	2008–2010	Yes	No

Discussions:-

Patients treated with reported less discomfort, used fewer opioids, and had improved hip function in this comprehensive review and meta-analysis of 30 prospective trials with over 1500 patients comparing postoperative outcomes in primary THA. There were no significant differences in complication rates, and these outcomes were consistent across several sensitivity analysis assumptions. The cause for decreased pain, lower narcotic use, and improved hip function with the AA is unknown. One possible explanation for these findings is that the AA prevents muscle splitting and soft tissue injury. In contrast, the PA includes tensor fascialata detachment, which may impede dynamic stability and need activity limits until soft tissues have recovered enough. Two randomized controlled trials have found reduced levels of C-reactive protein to support this idea. Furthermore, AA causes less soft tissue injury

to the gluteal and external rotator muscles than PA, according to magnetic resonance imaging and cadaver investigations. On balance, each of these AA-favoring Effects is of small-to-medium significance.

Inanother comparative study, after 14 months of follow-up, sensory deficiency was 3.8 percent with A and 0 percent with P. While data on comparative nerve damage was confined to these two investigations, other research has found a significant rate of sensory loss with A. This is most likely due to iatrogenic insult to the lateral cutaneous femoral nerve. Despite the increased patient-reported nerve damage rate with A, long-term functional restrictions or higher reoperation rates are improbable based on other research' findings. A meta-analysis comparing A and P found no group differences in intraoperative fracture risk and a decreased risk of dislocation with A. A comprehensive review published recently compared anterior, posterior, and lateral methods in primary THA.Complications were not carefully addressed in that review, despite the authors' conclusion that the incidence of complications was comparable amongst surgical methods. The period of follow-up in these evaluations varied somewhat, but was often less than a year. Our meta-analysis differs in several ways, including the inclusion of only studies with a mean follow-up time of at least one year, the reporting of several particular problems, and statistical adjustments to account for varied follow-up periods among studies[38].Several characteristics of our meta-analysis are unique, including the longest follow-up period of any A versus P evaluation and a complete assessment of complication rates. There are also certain restrictions. First, although having the longest mean follow-up of any review on this issue, Furthermore, while the RR statistic allows for group comparison of event rates on a similar scale (per person-year), event rates that are not consistent over time may make interpretation of these results more difficult. Second, whereas osteoarthritis was the most common diagnosis in each research, reporting of THA indications was uneven, thus confounding results.Third, due to the small number of studies reporting particular problems, some of the complication estimates given in this analysis may vary when new data from future research is included. Furthermore, given the small number of studies for subgroup comparisons, the effect of study design on complication rates should be taken with caution. Fourth, complication reporting varied widely between studies. Adherence to defined complication reporting rules will increase data openness and uniformity in the THA literature significantly.

Conclusions:-

Patients treated with AA reported less pain, used fewer opioids, and had improved hip function in this comprehensive review and meta-analysis of prospective trials comparing postoperative outcomes through 90 days of AA vs PA in main THA. There were no statistically significant differences in complication rates between AA and PA. Finally, the choice of surgical method in primary THA should take into account the surgeon's preference and expertise, as well as the patient's desire and anatomy.

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