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# META-ANALYSIS: A COMPARISON OF ASPIRIN AND RIVAROXABAN FOR PROPHYLAXIS OF VENOUS THROMBOEMBOLISM AFTER HIP OR KNEE ARTHROPLASTY

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**ABSTRACT**:
**BACKGROUND:** Anticoagulant therapy is used in all the patients undergoing total hip or knee arthroplasty for the prophylaxis of venous thromboembolism as standard care. The anticoagulant prophylaxis considerably reduces the amount of death and complications associated with these procedures. The prophylaxis for venous thromboembolism requires immediate hip or knee arthroplasty due to formation of clots in joints. Thus the anti clotting factors need to be administered to avoid diseases progression and prevent development of new medical complications. The present study focuses upon qualitative as well as quantitative comparison of efficacy of two blood thinners (Quinlan, DJ, Eikelboom, JW, Dahl, OE, et al., 2007) which can be used after surgical interventions for deep vein thrombosis. The study takes into consideration the effects of blood thinners on clot formation and the chances of clot formation even after taking such medications as these assure. In addition to this the cost effectiveness of aspirin is another benefit and favorable factor for higher use of aspirin prescription after Total knee arthroplasty as well as total hip arthroplasty.
**METHODS:** The methodology for research is based upon electronic data extraction strategies with use of certain exclusion and inclusion criteria.
**RESULTS**: ASPIRIN [acetylsalicylic acid] inhibits the activity of cyclo-oxigenase 1 irreversibly which in turn blocks the production of TXA2 (Geerts et al., 2008). It also inhibits the deposition aggregation of platelets below the endothelium thereby acting as an antithrombotic agent. Standard dosage for prophylaxis of Deep Vein Thrombosis and Pulmonary Embolism is 150mg per oral daily for 14 days postoperative after Total knee Replacement. Clinical trials suggest that aspirin is more effective in patients who undergo hip

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arthroplasty (Lee et al., 2013) and prevent the post operative complications. It is more economical with high efficiency in deep vein thrombosis

**CONCLUSION:** Rivaroxaban inhibits factor Xa. It is used as 10mg dose per oral daily for 14 days as a short term prophylaxis of DVT and PE. It is low molecular weight heparin which is obtained from standard heparin by chemical or enzymatic processes. It has more favorable pharmacokinetics than standard anticoagulant.
**KEYWORDS:** Deep vein thrombosis. Aspirin, rivaroxaban , thromboembolism, Total knee arthroplasty.

**BACKGROUND:** Deep vein thrombosis occurs due to prolonged bed rest and immobility, and it is seen mostly in patients who undergo hip arthroplasty. Due to blood stasis, hypercoagulation, blood vessel injury, blood flow reduces, and this complication occurs. With a proper treatment plan, these complications can be reduced. According to recent recommendations, the appropriate medication should be given at least 10-14 days after surgery and maximum gave up to 1month (Russell et al., 2013).
Although its high-efficiency, anticoagulants are still less preferred because of their adverse effects on bleeding and increased risk of thrombocytopenia. Also, chances of infection and hypersensitivity are high due to the administration of anticoagulants, which further escalates the rate of visits to hospitals.
Figure 1 shows the literature search and selection strategy

**EFFECT SIZE**: The present Meta-analysis study encompasses a large effect size with a significant difference between the effects of two medications.The study will involve the use of 6 population statistic databases with the size of 14570 patients who undergone Total Hip Arthroplasty or Total Knee Arthroplasty, and Aspirin was given as prophylaxis as compared to Rivaroxaban as antithrombotic agent given to 70% of patient.
A study was considered for comparison inefficacy of Aspirin, which weighed against Rivaroxaban (Piovella et al., 2005). In the second study, the dose for the medication varied for both interventions in 2 groups.One group in which Rivaroxaban and the other group give the intervention for medication is administered with Aspirin. The participants in both groups were not blind to the study, and the control group is the patient group administered withRivaroxaban. The case groups are the patient group who were given Aspirin after surgical procedures.
The incidence of Venous Thromboembolism in the group administered with Aspirin and the group administered with rivaroxaban group was .6.9%for Aspirin and 5.7% for Rivaroxaban ($P$ = 0.83)(Saltybaeva et al., 2014).

**METHODS**:
**SEARCH STRATEGY:**
The preferred data search strategy and effect size analysis was done with an electronic database search strategy. Higher efficacy results were obtained fromPubMed, Cinahl, Medline, Cochrane Database of Systematic Reviews (CDSR), PhamraGKB, SAGE, from inception to December 2020. The search strategy was based upon advanced search in

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databases using multiple keywords connected using operators such as AND, OR, NOT. The search strategy was maximized by the combination of keywords such as 'rivaroxaban' AND 'aspirin' OR total knee arthroplasty OR total hip arthroplasty OR knee replacement OR hip replacement for the search of MeSH fields. The comprehensive list of references was retrieved manually for further identification of relevant articles.

**STUDY INCLUSION AND EXCLUSION CRITERIA:**

The eligible research studies for the meta-analysis study was based upon a particular population size in which interventions were based upon changes in Aspirin in one population, and Rivaroxabanwas given to another study group. This was a case-control study combination for chemoprophylaxisdone after total knee arthroplasty or total hip arthroplasty. The different exclusion and inclusion criteria were set up. The inclusion criteria were set up if the studies reported primary vein thromboembolism outcomes and secondary outcomes of the surgical interventions such as bleeding or wound complications.

This vein thromboembolism includes Deep Vein Thrombosis and Pulmonary Embolism. The VT was diagnosed by clinical methods or by the patient's signs and symptoms. The severity of bleeding was analyzed, and the tissue-specific bleeding was analyzed as internal bleeding; thus, the reoperation possibilities were also analyzed. In addition to this, the quantitative study data was taken up from the most recent studies. The publications were mostly from peer-reviewed articles, and the English language was the inclusion criteria. The exclusion criteria were setup for excluding the conference presentations, review papers, case reports, reviews, editorials, and expert opinions.

**DATA EXTRACTION AND CRITICAL APPRAISAL:**

Data extracted from relevant research studies was investigated by reviewing the data from population health databases. The inclusion criteria were narrowed in terms of the study year, the country where the study was performed, the total number of patients who underwent TKA and THA, and then the bleeding was observed in some of them and thus the number of patients who received Rivaroxaban or Aspirin. The studies were further studied for primary outcomes of venous thromboembolism. The Secondary outcomes were based upon the severity of bleeding as well as wound complications and clotting. The risk for bias in the considered studies was analyzed by Cochrane Collaboration's tool.

**STUDY QUALITY ASSESSMENT:**

The statistical analysis of the outcomes majorly analyzed the relevance of the study. The weighted mean difference and standard deviation were used along with relative risk (RR). The heterogeneity was an essential consideration in the population demographics, and thus the random-effects model was used in the study design. The analysis for sensitivity was also performed. All statistical analysis was performed using Review Manager 5.3 software (Cochrane Collaboration, Software Update, Oxford, United Kingdom).

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The analysis includes electronic searches of databases of various researches carried out on patients who underwent Total Hip or Knee Replacements. All the studies have been carried out institutionally following ethics and with the consent of patients. The medical history of patients, age, and other parameters like socioeconomic status have been standardized. Various population groups have been taken into consideration to minimize bias.

According to an article published in The New England Journal of Medicine, out of 3424 patients who underwent Total Hip Arthroplasty or Total Knee Arthroplasty (Anderson et al., 2018),Venous Thromboembolism occurred in 0,64% of patients who received Aspirin as prophylaxis as compared to 0.70% of the patients who received Rivaroxaban as an antithrombotic agent

Another research article published in the International Research Journal of Pharmaceutical and Biosciences based on a study carried out from February 2019 till May 2019 on 204 patients (Kumaravel et al.,2019). The effect of Aspirin versus Rivaroxaban undergoing Total Knee Replacement,the effectiveness of Aspirin has weighed against Rivaroxaban. The symptoms of Deep Vein Thrombosis were observed in the postoperative period in the patients divided into groups receiving Aspirin 150 mg daily versus patients who received Rivaroxaban 10mg daily from 1 – 14 postoperative days. Deep Vein Thrombosis was found in 4.615% of patients in the Aspirin group, whereas 6.154% of patients suffered DVT Rivaroxaban group. Blood loss events like hematoma formation and significant bleeding occurred in 3.07% in the Aspirin group compared to 4.61% in the Rivaroxaban group.

SAGE journals published an article comparing primary outcomes (Deep Vein Thrombosis /Pulmonary Embolism) and secondary outcomes (bleeding and wound complications) in the follow up of prophylaxis by Aspirin and Rivaroxaban following TKA and THA. The dosage of Aspirin ranged from 81mg daily to 325mg daily, and that for Rivaroxaban was 10 mg daily (Xu, Kanagaratnam, Cao, Chaggar, & Bruce, 2020).The study is based on 4594 patients, out of which 2257 were in the Aspirin group, and 2337 were in the Rivaroxaban group. The patients whose mean age was 62.7 to 71.2 years were followed up in the postoperative phase up to 90 days. No significant difference was found in the DVT rate in Aspirin and Rivaroxaban groups. No difference in major bleeding was found either.

A study on 268 Korean patients (Chung et al., 2018) from May 2011 to November 2013 undergoing Total Knee Replacement was carried out. Divided into groups that received 100mg aspirin and the others received 10mg Rivaroxaban were followed up postoperatively. The incidence of overall venous thromboembolism was not significant. However, it was significantly lower in the group having Rivaroxaban(10%) for chemoprophylaxis as compared to Aspirin(38.2%). The mean amount of bleeding was similar among both groups.

In the study conducted by the American College of Cardiology ("Aspirin for VTE Prophylaxis After Hip and Knee Surgery,"n.d.), the authors performed a systematic review and compared Aspirin for Venous Thromboembolism prophylaxis in patients undergoing Total Hip Replacement or Total Knee Replacement. In 6060, patients were involved in

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randomized clinical trials, Relative Risk (RR) for Deep Vein Thrombosis in 1.04 patients, and pulmonary embolism in 1.01 patients. The study concluded that Aspirin did not differ significantly from other coagulation therapies for prophylaxis of postoperative Venous Thromboembolism.

Jichao Liu etal.Medicine (Baltimore) studied the efficacy of Rivaroxaban for prophylaxis of DVT and PE after total hip replacement or total knee arthroplastyin thirteen RCTs, which were included in the study. It showed that the overall rate of Venous thromboembolism events, Deep Vein Thrombosis, and death were 1%, 6%, <1%, and <1%.which showed that Rivaroxaban was proven to have superior effect in THA patients.

## **RESULTS**:
## **QUALITY OF STUDIES:**

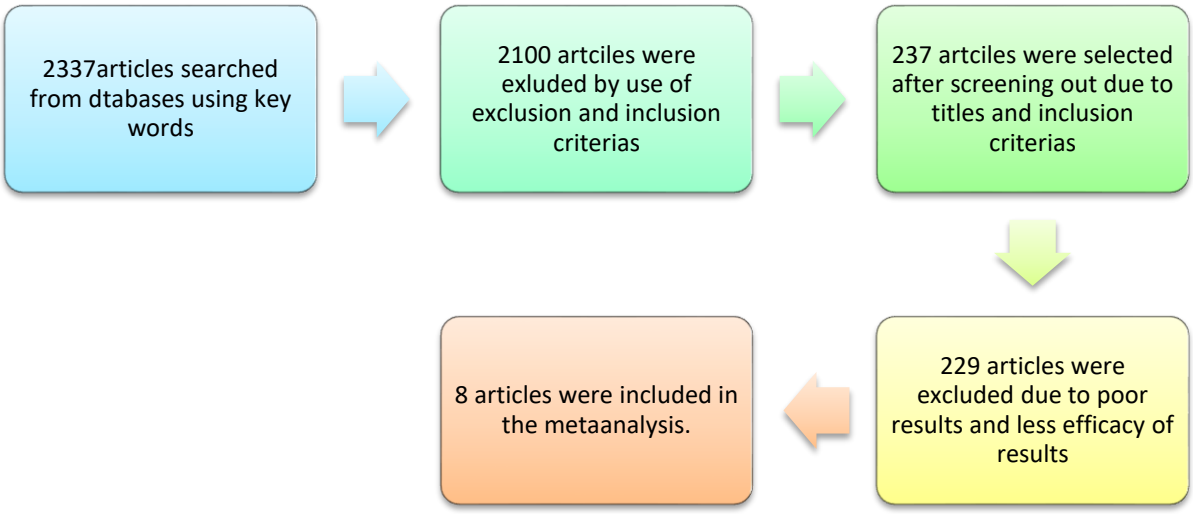


Figure 1 shows the PRISMA flow chart for meta-analysis of Aspirin versus Rivaroxaban for venous thromboembolism prophylaxis after TKR or THA.

Out of 2337 identified articles, the total number of participants was14570, the effect size was large, but no gender bias was done. In addition to this, the baseline age of participants was 65+ 5 years. The Risk Rate of Venous thromboembolism after the Total Hip ARTHROPLASTY andTotal Knee ARTHROPLASTY was 1.12 (95% CI, 0.72-1.82) for Aspirin in comparison to other anticoagulants as warfarin. The findings for the venous thromboembolism were divided into 2 subcategories, which are deep vein thrombosis (DVT) and pulmonary embolism. Thus risk rate for DVT is 1.02; 95% CI, 0.72-1.64) and PE risk rate is 1.01; 95% CI, 0.68-1.45).

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| CITATION | RANDOM SEQUENCE GENERATION | ALLOCATION CONCEALMENT | BLINDING OF PARTICIPANT AND PERSONNAL | BLINDING OF OUTCOME ASSESSMENT | INCOMPLETE OUTCOME DATA | SELECTIVE REPORTING |
|---|---|---|---|---|---|---|
| **(Anderson et al., 2018)** | Low | low | Low | Low | low | low |
| **(Kumaravel et al.,2019).** | Low | low | Unclear | Low | high | low |
| **(Xu et al., 2020).** | Low | high | Low | Low | low | low |
| **(Chung et al., 2018)** | unclear | unclear | Unclear | High | high | low |
| **Qiang Huang et al.2019** | High | high | Low | Low | low | high |
| **(Mistry et al., (2017)** | Low | high | Low | Low | low | high |
| **(Colleoni et al., 2017 )** | high | low | Low | Low | low | high |
| **(Stephen et al., 2019)** | Low | high | Low | Low | low | high |

**Table 1 shows the risk of bias assessment for included studies according to the Cochrane Collaboration's tool.**

| STUDY | EXPERIMENTAL | RISK RATIO | LOWER LIMIT | UPPER LIMIT | P VALUE |
|---|---|---|---|---|---|
| **(Anderson et al., 2018)** | VTE | 1.085 | 0.48 | 2.45 | 0.0845 |
| **(Kumaravel et al.,2019).** | VTE | 1.43 | 0.23 | 3.9 | 0.349 |
| **Qiang Huang et al.2019** | VTE | 1.1 | 0.505 | 15.46 | 0.81 |
| **(Mistry et al., (2017)** | VTE | 1.02 | 0.34 | 5.6 | 0.66 |
| **(Colleoni et al., 2017 )** | VTE | 1.556 | 0.156 | 15.46 | 0.706 |
| **(Stephen et al., 2019)** | VTE | 0.98 | 0.275 | 4.67 | 0.38 |

**Table 2 shows the forest plot data for VTE (VENOUS THROMBOEMBOLISM)**

| | | X value | Y value |
|---|---|---|---|
| 6 | **(Anderson et al., 2018) RISK RATIO** | 1.085 | 6 |
| | **LOWER LIMIT** | 0.48 | 6 |
| | **UPPER LIMIT** | 2.45 | 6 |
| 5 | **(Kumaravel et al.,2019)RISK RATIO** | 1.43 | 5 |
| | **LOWER LIMIT** | 0.23 | 5 |
| | **UPPER LIMIT** | 3.9 | 5 |
| 4 | **Qiang Huang et al.2019 RISK RATIO** | 1.1 | 4 |
| | **LOWER LIMIT** | 0.505 | 4 |

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| | | | |
|---|---|---|---|
| | UPPER LIMIT | 15.46 | 4 |
| 3 | (Mistry et al., (2017) RISK RATIO | 1.02 | 3 |
| | LOWER LIMIT | 0.34 | 3 |
| | UPPER LIMIT | 5.6 | 3 |
| 2 | (Colleoni et al., 2017 )RISK RATIO | 1.556 | 2 |
| | LOWER LIMIT | 0.156 | 2 |
| | UPPER LIMIT | 15.46 | 2 |
| 1 | (Stephen et al., 2019) RISK RATIO | 0.98 | 1 |
| | LOWER LIMIT | 0.275 | 1 |
| | UPPER LIMIT | 4.67 | 1 |

**Table 3 shows the data for forest plot and the x values as risk ratio and 95%confidence interval ratios and Y values as the number of studies.**

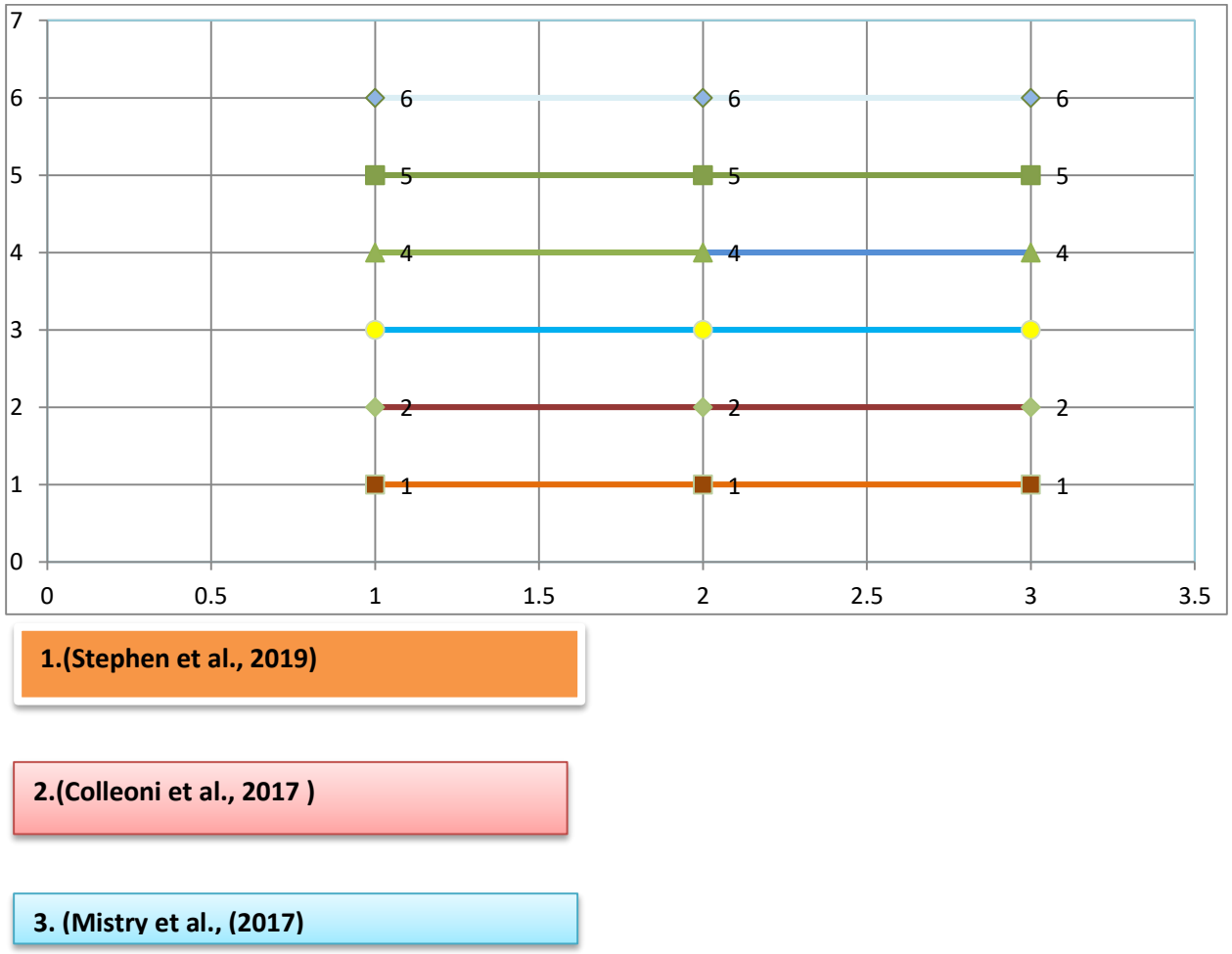

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**FIGURE 2 SHOWS THE FOREST PLOT OF VENOUS THROMBOEMBOLISM**

**DISCUSSION**:

The secondary outcomes, such as severe internal bleeding, and the risk of hemolysis, increase by several folds accounting up to 3 times. In addition to this, the chances of wound hematoma and wound sepsis did not differ in statistical results for patients who received Aspirin and Rivaroxaban.Also, there is no significant statistical difference in the potential risk of VTE, DVT, and PE between administration of Aspirin and Rivaroxaban after THA OR TK.

The risk for venous thromboembolism doesn't vary statistically for the administration of Aspirin and(RR, 0.76; 95% CI, 0.41-1.61) and rivaroxaban (RR, 1.57; 95% CI, 0.57-4.23). Thus the quality of evidence had a diverse range with good quality to average quality. Still, no significant statistical difference was seen for aspirin and rivaroxaban administration after total knee arthroplasty and total hip arthroplasty.

In a study based on 390 patients reported by Qiang Huang 2019 et al,all the patients, initially given Enoxaprin subcutaneous, were divided into two groups. 198 patients were followed by 100 mg of Aspirin once daily, whereas 192 were given 10mg of Rivaroxaban daily for 16 days and followed for the next 90 days. Incidence of Venous Thromboembolism was 6.6% in the Aspirin group and slightly less at 5.7% in the Rivaroxaban group. Major bleeding occurred in 2 patients of the Aspirin group while only 1 patient reported in the Rivaroxaban group. There was no incidence of Pulmonary embolism in the Rivaroxaban group than one reported case in the Aspirin group. Due to no significant differences in the follow up of complications, Aspirin was considered to be a safe and cheap alternative.

Another study by Zou and others conducted on 324 patients from 2011 to 2013 comparing the safety and efficacy of Aspirin, Rivaroxaban, and Low Molecular Weight Heparin(LMWH) for prophylaxis of Deep Vein Thrombosis. It was reported that DVT was least reported in the group where oral Rivaroxaban was administered at a dose of 10 mg daily postoperatively for 14 days. Still, at the same time, postoperative blood loss and wound complications were observed more in this group. There was no significant

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difference in the incidence of DVT in groups with Aspirin at 100mg daily and those with subcutaneous LMWH at a dose of 0.4 ml daily in the postoperative period.
Jose LuizColleoni et al compared the efficacy and safety of Aspirin and Rivaroxabanto preventvenous thromboembolism after Total Knee Arthroplasty in 32 patients. Group A received 300 mg of Aspirin, and Group B received 10 mg of Rivaroxaban daily for 14 days postoperatively and was followed up daily for four weeks. No observable differences were found in both groups. Hence, both Aspirin and Rivaroxaban were equally effective for prophylaxis of Venous Thromboembolism after Total Knee Arthroplasty.
Prolonged follow-up of 1107 patients who had completed 6 to 12 months of anticoagulation therapy with either Rivaroxaban 20 mg or 10 mg once daily. Aspirin 100mg once daily showed that recurrent Venous Thromboembolism was reported 1.9% in the group which was given Rivaroxaban 20 mg daily, 1.6% in the groupwhich was given Rivaroxaban 10 mg daily, and 5.0% in the Aspirin group. Major bleeding was reported less in the groups which were managed with Rivaroxaban as compared to the Aspirin group, which projects a favorable benefit-risk profile in the Rivaroxaban group.

## CLINICAL EFFICACY:

Asymptomatic patients are more prone to recurrence of DVT, whereas the clinical outcomes reveal the lower efficacy of DVT recurrence after surgical interventions for knee or hip Arthro plasty. Clinical efficacy of the literature reviews and randomized trials for comparison of Aspirin and Rivaroxaban reveals 3.6% chances for recurrence in patients with provoked patients. But the possibilities for recurrence are 5.6% (Jeffrey et al., 2017) in patients with unprovoked DVT even after taking Aspirin instead of Rivaroxaban. It was evident that anticoagulants such as Rivaroxaban alone can lessen the recurrence incidents by 70% in unprovoked and provoked DVT patients.
Rivaroxabanis also known as low molecular weight heparin. If replaced with Aspirin for upto 1 year in DVT patients, preventing lethargic or non-lethargic episodes recurrent venous thromboembolism, without the rise in the risk of hemolysis was 20-mg dose for lethargic patients and 10-mg dose for non-lethargic patients. Prevention of recurrent pulmonary embolism is essential because the case-fatality rate at 30 days is at least twice as high with pulmonary embolism as deep-vein thrombosis. Pulmonary embolism, which is a complication of DVT,must be prevented with a combination of Aspirin and Rivaroxaban as the mortality rate for pulmonary embolism is twice in 30 days as with severe DVT.

## ANALYSIS:

Both Aspirin and Rivaroxaban effectively prevent postoperative complications of TTHA and TKA and are used regularly. The action of Aspirin is not limited to the arterial circulation. It also has antithrombotic effects on venous thromboembolism. It acetylates fibrinogen and fibrin, inhibits the activation of thrombin mediated factor XIII. It has been shown that Aspirin reduces Proximal as well as distal deep vein thrombosis and

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minimizes fatal as well as non-fatal PEs. Besides, it is an inexpensive, mild, well-tolerated, widely available, and effective antithrombotic agent with a well-established side effect profile. Even in mild dosage,Aspirin catalyzes the platelet COX irreversibly. This further interferes with the aggregation of platelets and increased bleeding time. Even in single dosage irreversibly inhibit the formation of TXA2, which is for 8-11 days. Proteins cannot be formed by platelets, which means the cyclo-oxygenase enzyme can be reformed. In mild dosage i.e. 40 mg daily ofAspirin is sufficient for inhibiting the platelet aggregation. Results show that Aspirin may be theright choice for chemoprophylaxis due to its lowercost and similar prophylactic profile to Rivaroxaban (Bozic et al., 2010).
Ina clinical trial such as pulmonary embolism prevention,Aspirin was majorly taken by patients who undergo hip or knee arthro plasty and show better results from deep vein thrombosis or pulmonary embolism. In contrast, no statistical evidence was observed for Aspirin and Rivaroxaban administration for TKA and THA. The mean difference deviation and the risk rates were near the baseline. According to the American Association of orthopedic surgery, in 2012 suggests that Aspirin is the prophylactic drug for thrombophlebitis.

## CONCLUSION:

The pharmacodynamic and the pharmacokinetic action of Aspirin for blood thinning and decreased platelet aggregation was equivalent to the direct oral administration of Rivaroxaban for its anticoagulation. When Aspirin was administered in a small amount, it irreversibly catalyzes the platelet enzymes and promotes the formation of thromboxane $A_2$, thus promoting vasoconstriction. Thereforeboth the medications prevent the VTE resurgence at the same levels. Still, some additional benefits of Aspirin are that it is safer and has lesser side effects than Rivaroxaban, and it is cheaper than Rivaroxaban formore prolonged duration prophylaxis. There was no bias in the study as for both groups of medication administration and no significant differences in terms of mean difference as well as standard deviation. The patient characters were similar, and both had undergone surgical interventions for DVT and PE, i.e. similar operative characteristics. Thus cohort study had a pooled data of 6, thus improving the efficacy of results.
The limitation occurred in terms of heterogeneity for study protocol for dosage difference. It doesn't address the efficacy of chemoprophylaxis regimens for high-risk populations and is more vulnerable to such diseases as patients with cancer or a family history of this disease.

**Ethical Approved** : Approved by Yan’an Hospital Affiliated to Kunming Medical University Ethical Committee.
**Declarations**: Not applicable
**Funding**: Not applicable yet
**Conflicts of interest/Competing interests**: The authors declare that they have no competing **interests.**
**Data availability**: The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

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**REFERENCES**:

1. AmFam Physician **(**2018) Aspirin No Different Than Rivaroxaban for Prevention of VTE After TKA or THA 98(4):248.
2. Bates, S.M., and Ginsberg, J.S. (2004). Treatment of Deep-Vein Thrombosis. *New England Journal of Medicine*, 351(3), pp.268–277.
3. Anderson, D. R., Dunbar, M., Murnaghan, J., Kahn, S. R., Gross, P., Forsythe, M., …Vendittoli, P.-A. (2018). Aspirin or Rivaroxaban for VTE Prophylaxis after Hip or Knee Arthroplasty. *New England Journal of Medicine*, *378*(8), 699–707. https://doi.org/10.1056/nejmoa1712746
4. Geerts, W. H., Bergqvist, D., Pineo, G. F., Heit, J. A., Samama, C. M., Lassen, M. R., & Colwell, C. W. (2008). Prevention of Venous Thromboembolism. *Chest*, *133*(6), 381S-453S. https://doi.org/10.1378/chest.08-0656
5. Chung, K. S., Shin, T. Y., Park, S. H., Kim, H., & Choi, C. H. (2018). Rivaroxaban and Acetylsalicylic Acid for Prevention of Venous Thromboembolism Following Total Knee Arthroplasty in Korean Patients. *Knee surgery & related research*, *30*(3), 247–254. https://doi.org/10.5792/ksrr.17.092
6. Xu, J., Kanagaratnam, A., Cao, J. Y., Chaggar, G. S., & Bruce, W. (2020). A comparison of Aspirin against Rivaroxaban for venous thromboembolism prophylaxis after hip or knee arthroplasty: A meta-analysis. *Journal of Orthopaedic Surgery*, *28*(1), 230949901989602. https://doi.org/10.1177/2309499019896024
7. Stoeva, N., Staneva, M., Kirova, G., &Bakalova, R. (2018). Deep venous thrombosis in the clinical course of pulmonary embolism. *Phlebology: The Journal of Venous Disease*, *34*(7), 453–458. https://doi.org/10.1177/0268355518819510
8. Quinlan, DJ, Eikelboom, JW, Dahl, OE, etal.Association between asymptomatic deep vein thrombosis detected by venography and symptomatic venous thromboembolism patients undergoing elective hip or knee surgery. J ThrombHaemost2007; 5: 1438–1443.
9. Bozic, KJ, Vail, TP, Pekow, PS, etal.DoesAspirin have a role in venous thromboembolism prophylaxis in total knee arthroplasty patients? J Arthroplast2010; 25: 1053–1060.
10. Kumaravel et al, (2019) THE EFFECT OF ASPIRIN VERSUS RIVAROXABAN TO PREVENT VENOUS THROMBOEMBOLISM AFTER TOTAL KNEE ARTHROPLASTY S, International Research Journal of Pharmaceutical and Biosciences.
11. Zou, Y, Tian, S, Wang, Y, etal.AdministeringAspirin, Rivaroxaban and low-molecular-weight heparin to prevent deep venous thrombosis after total knee arthroplasty. Blood Coagul Fibrinolysis 2014; 25: 660–664.
12. Gomez-Outes, A, Terleira-Fernandez, AI, Suarez-Gea, ML, etal.Dabigatran, Rivaroxaban, or apixaban versus enoxaparin for thromboprophylaxis after total hip or knee replacement: a systematic review, meta-analysis, and indirect treatment comparisons. BMJ 2012; 344: e3675.
13. Bozic, KJ, Vail, TP, Pekow, PS, et al. (2010) Does Aspirin have a role in venous thromboembolism prophylaxis in total knee arthroplasty patients? J Arthroplast; 25: 1053–1060.
14. Park, K. H., Cheon, S. H., Lee, J. H., & Kyung, H. S. (2012). Incidence of venous thromboembolism using 64 channel multidetectorrow computed tomography-indirect venography and anticoagulation therapy after total knee arthroplasty in Korea. *Knee surgery & related research*, *24*(1), 19–24. https://doi.org/10.5792/ksrr.2012.24.1.19

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15. Saltybaeva, N., Jafari, M. E., Hupfer, M., &Kalender, W. A. (2014). Estimates of effective dose for CT scans of the lower extremities. *Radiology*, *273*(1), 153–159. https://doi.org/10.1148/radiol.14132903
16. Piovella, F., Wang, C. J., Lu, H., Lee, K., Lee, L. H., Lee, W. C., Turpie, A. G., Gallus, A. S., Planès, A., Passera, R., Rouillon, A., & AIDA investigators (2005). Deep-vein thrombosis rates after major orthopedic surgery in Asia. An epidemiological study based on postoperative screening with centrally adjudicated bilateral venography. *Journal of thrombosis and hemostasis: JTH*, *3*(12), 2664–2670. https://doi.org/10.1111/j.1538-7836.2005.01621.x
17. Russell, R. D., Hotchkiss, W. R., Knight, J. R., &Huo, M. H. (2013). The efficacy and safety of Rivaroxaban for venous thromboembolism prophylaxis after total hip and total knee arthroplasty. *Thrombosis*, *2013*, 762310. https://doi.org/10.1155/2013/762310
18. Lee, W. S., Kim, K. I., Lee, H. J., Kyung, H. S., &Seo, S. S. (2013). The incidence of pulmonary embolism and deep vein thrombosis after knee arthroplasty in Asians remains low: a meta-analysis. *Clinical Orthopedics and related research*, *471*(5), 1523–1532. https://doi.org/10.1007/s11999-012-2758-9
19. Colleoni, J. L., Ribeiro, F. N., Mos, P., Reis, J. P., Oliveira, H. R., & Miura, B. K. (2017). Venous thromboembolism prophylaxis after total knee arthroplasty (TKA): Aspirin *vs.* Rivaroxaban. *Revistabrasileira de ortopedia*, *53*(1), 22–27. https://doi.org/10.1016/j.rboe.2017.11.007
20. Zou, Y., Tian, S., Wang, Y., & Sun, K. (2014). Administering Aspirin, Rivaroxaban and low-molecular-weight heparin to prevent deep venous thrombosis after total knee arthroplasty. *Blood coagulation &fibrinolysis : an international journal in haemostasis and thrombosis*, *25*(7), 660–664. https://doi.org/10.1097/MBC.0000000000000121