Systematic Review of Perioperative Immunosuppressant Use and Postoperative Outcomes following Plastic Surgery Procedures

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INTRODUCTION

- **Immunosuppressive medications** are essential in the **management of autoimmune disease, connective tissue disorders, and solid organ transplantation**.[1]
- With improved long-term survival among transplant recipients, **plastic surgeons** increasingly **encounter patients** maintained **on chronic immunosuppression**.[1-3]
- The impact of perioperative immunosuppressant use on wound healing and surgical outcomes in plastic and reconstructive surgery remains poorly defined.
- This study systematically evaluates the **association between perioperative immunosuppressive therapy** and **postoperative complications** in **plastic surgery patients**.

METHOD

- A **systematic review** was conducted using **PubMed** and **Scopus**.
- MeSH terms and keywords related to **perioperative care, immunosuppressive agents, plastic surgery procedures**, and **wound healing** outcomes were combined to produce the search.
- Subsequent **exclusion of allograft procedures** due to the confounding effect of lifelong immunosuppression.
- Removed duplicates and applied predefined inclusion criteria (**English-language human-studies** evaluating **plastic surgery procedures** and **postoperative outcomes**).
- **Reviews and non-human studies were excluded**. Immunosuppressive agents were categorized by drug class.
- Studies were analyzed by team members on **Covidence** software to ensure compliance with **PRISMA research standards**.

RESULTS

- Initial search yielded **661 studies.** Removing the term "allograft" reduced findings to **274 studies**. Applying filters for human-studies and English language yielded **230 studies**. Following review process on Covidence, **fourteen studies met eligibility.**
- The fourteen studies were analyzed; several evaluated multiple drug classes: corticosteroids (n=12), calcineurin inhibitors (n=9), antimetabolites (n=10), mTOR inhibitors (n=7), aminoquinolines/TNF-α inhibitors (n=2), and unspecified agents (n=2).
- **Corticosteroids** were **most frequently studied**; 4 of 12 studies demonstrated **increased rates of delayed wound healing**, **infection,** or **revision/readmission**, while others found no significant association.
- **mTOR inhibitors** were associated with **wound breakdown** or **flap complications** in 2 of 7 studies.
- **Aminoquinolines/TNF-α inhibitors** demonstrated **variable outcomes**, including reported flap failure in select cohorts.

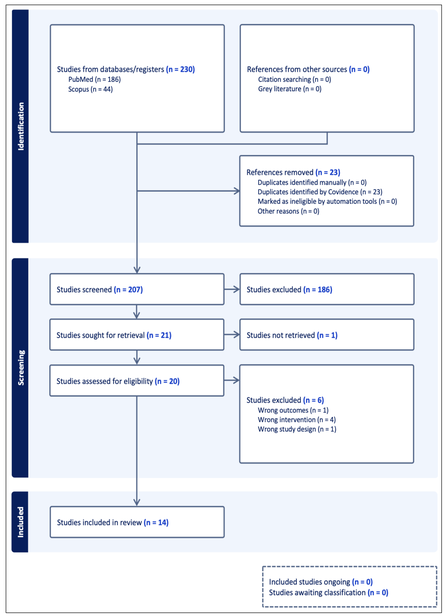

Figure 1. Prisma Flow Diagram depicting study selection.

Authors	Study Type	Drug Class	Procedure	Key Outcome
Schaverien et al.	Case Series	Calcineurin Inhibitor, Corticosteroid, mTOR Inhibitor, Antimetabolite	Flap- or graft- based reconstructive procedures.	Postoperative complications occurred at low rates.
Cohen et al.	Case Series	Corticosteroid, Antimetabolite, Calcineurin Inhibitor	Flap- or graft- based reconstructive procedures. Entire Body.	Some postoperative infections or necrosis reported.
Kim (2021)	Case Series	Corticosteroid, Antimetabolite, Aminoquinolone	Flap- or graft- based reconstructive procedures. Lower extremity.	Postoperative complications occurred at low rates.
Koonce et al.	Case Series	Calcineurin Inhibitor, Corticosteroid, Antimetabolite	Breast Reconstruction procedures.	Mild delay in wound healing observed in some cases.
Miller et al.	Case Series	Calcineurin Inhibitor, Corticosteroid, mTOR Inhibitor, Antimetabolite	Flap- or graft- based reconstructive procedures. Head and Neck.	Some postoperative infections or necrosis reported.
Özkan et al.	Case Series	Calcineurin Inhibitor, Corticosteroid, Antimetabolite, mTOR Inibitor	Flap- or graft- based reconstructive procedures. Full Body.	Some postoperative infections or necrosis reported.
Ka and Kim 2019	Case Series	Calcineurin Inhibitor, Corticosteroid, mTOR Inhibitor, Antimetabolite	Flap- or graft- based reconstructive procedures.	Mild delay in wound healing observed in some cases.
Crižan et al.	Case Series	Immunosuppressants unspecified	Flap- or graft- based reconstructive procedures. Head and Neck.	Some postoperative infections or necrosis reported.
Barcha and Ranzer	Cohort	Corticosteroid	General plastic or reconstructive procedures.	Some postoperative infections or necrosis reported.
Shuck et al.	Cohort	Corticosteroid, Antimetabolite, Aminoquinolone, TNF-Alpha Inhibitors	Breast Reconstruction procedures.	Mild delay in wound healing observed in some cases.
Sbitany et al.	Case Series	Calcineurin Inhibitor, Corticosteroid, mTOR Inhibitor, Antimetabolite	Flap- or graft- based reconstructive procedures. MVFTT.	Mild delay in wound healing observed in some cases.
Janus et al.	Case Series	Immunosuppressants unspecified	Flap- or graft- based reconstructive procedures. Head and Neck.	Mild delay in woulnd healing observed in some cases.
Wang et al.	Cohort	Calcineurin Inhibitor, Corticosteroid, mTOR Inhibitor	General plastic or reconstructive procedures. MVFTT. Head and Neck.	Some postoperative infections or necrosis reported.
Bilzer et al.	Cohort	Calcineurin Inhibitor, Corticosteroid, mTOR Inhibitor, Antimetabolite	General plastic or reconstructive procedures. Specifically following trauma, tumor or miscellaneous.	Postoperative complications occurred at low rates.

Table 1. Breakdown of included studies by type, medications evaluated, plastic surgery procedure, and outcomes.

P Classification Category	Medications
Corticosteroids*	Prednisone, Prednisolone, Triamcinolone, Deflazacort, Dexamethasone, Hydrocortisone
mTOR Inhibitors*	Sirolimus, Everolimus
Antimetabolites*	Azathioprine, Methotrexate, Lefluonomide, Mycophenalate, Methylsulfonylmethane
Calcineurin Inhibitors*	Tacrolimus (/FK506), Cyclosporine, Cyclopsorine A
Aminoquinolone*	Hydroxychloroquine
TNF Alpha Inhibitors*	Etanercept, Adalimumab, Infliximab
* : Pharmacologic Classifications	

Table 2. Categorization of medications used by patients by pharmacologic classification.

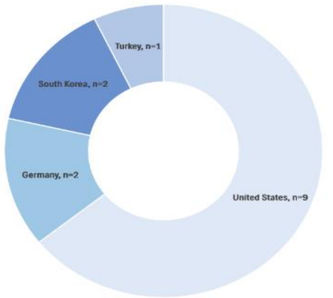

Figure 2. Breakdown of studies by country where study was conducted.

CONCLUSIONS

- **Perioperative immunosuppression** appears to **increase postoperative complication risk** in plastic surgery, though **effects vary by drug class**.
- **Corticosteroids, mTOR inhibitors, and TNF-α inhibitors** may warrant **heightened perioperative consideration**.
- **Calcineurin inhibitors and antimetabolites** appear comparatively **lower risk**.

LIMITATIONS & NEXT STEPS

- Limitations:
  - Selection Bias
  - English-Language Bias
  - Variability in study designs and outcomes across included papers
- Future research: further investigate the association between immunosuppressors and various subpopulations.

DISCLOSURES

- No Disclosures.

REFERENCES

- Please scan the QR Code below to view our references: