Critically Appraised Topic (CAT)

Project Team:
6A-3
Project Team Participants:
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Clinical Question:
Do calcium channel blockers impact gingival hyperplasia and treatment outcomes?
PICO Format:
P:
Patient who has hypertension
I:
Taking calcium channel blockers to control hypertension
C:
Not using calcium channel blockers via switching from calcium channel blockers to another medication to control hypertension
O:
Gingival hyperplasia control
PICO Formatted Question:
Can gingival hyperplasia be well controlled in patients who are taking calcium channel blockers for hypertension?
Clinical Bottom Line:
Yes, gingival hyperplasia can be controlled/prevented in patients who are taking calcium channel blockers. There are also viable surgical options for patients who have gingival overgrowth as a result of calcium channel blockers, but the recurrence rate is high. A final option is to consult with their physician to switch from a calcium channel blocker to another medication to control hypertension, such as an ACE inhibitor.
Date(s) of Search:
9/20/2020
Database(s) Used:
PubMed
Search Strategy/Keywords:
Searched for drug induced gingival overgrowth/dentistry/surgical interventions/preventions and articles classified as systematic reviews or randomized controlled studies.
MESH terms used:
Gingival overgrowth **Hyperplasia**

Calcium channel blockers
Treatment
Dental

Article(s) Cited:

Gaur S and Agnihotri R. IS dental plaque the only etiological factor in amlodipine induced gingival overgrowth? A systematic review of evidence. 2018. *Journal of exp dent.* Doi: 10(6): e610-61

Mavrogiannis M, Ellis J.S, Seymour R.A., and Thomason J.M. The efficacy of three different surgical techniques in the management of drug induced gingival overgrowth. *Journal of Clinical Periodontology.* 20 July 2006. doi: 10.1111/j/1600-051x

Study Design(s):

Article 1 – Is dental plaque the only etiological factor in amlodipine induced gingival growth? A sysmtematic review of evidence.

- **Used Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISM)as their method. They excluded animal studies, expiremental, in vitro, case reports, pediatric patients, and any studies published in another language besides English. They searched PubMed with key words "amlodipine, gingiva, gingival overgrowth, enlargement, and hyperplasia" from 2013 till January 2018. Asseses each article and assigned it a score from 0-8, with 7-8 range indicating a high quality methods and material used in the article. 13 articles in total were used.**

Article 2 – The efficacy of three different surgical techniques in the management of drug induced gingival overgrowth

- **2 part study comparing flap surgery to scalpel gingivectomy in the 1st study and then scalpel gingivectomy to laser gingivectomy in the 2nd part. All patients chosen for the surgeries had gingival overgrowth in excess of 30% effecting at least 8 upper or lower anterior teeth. Patients with systemic diseases that may affect the periodontium were excluded from the study. In each patient half the gingival overgrowth was treated using the conventional scalpel gingivelectomy and the other half was treated using flap surgery. The allocation of the treatment to the side was randomized. The same procedure was taken when comparing part 2 of the study with the conventional scalpel gingivectomy and the laser gingivectomy. All procedures were done under lidocaine (4ml 2% with 1:80,000 epi) and by the same operator.**
- **Periodontal variables were controlled by measuring pocket depths at 6 points around each tooth to establish a baseline and then compared to 1, 3, and 6 months post surgery.**

- **Patients were also given the same at home oral hygiene instructions along with a full mouth prophylaxis**
- **Gingival overgrowth was assessed on plaster study models using an overgrowth index**
- **Alginate impressions were taken from each patient 1 week after the surgery was complete**
- **The plaster models were scored by one assessor who was blinded to the surgical procedures**
- **There were 23 patients for scalpel gingivectomy and 23 patients for laser gingivectomy, with all getting the convetional flap surgery**
- **Mean overgrowth was taken at 1, 3, and 6 months post surgery and recurrence of overgrowth was compared to the baseline numbers (1 week post surgery)**

Reason for Article Selection:

This systematic review addressed the PICO question directly by stating the main factors that induce gingival overgrowth for patients taking calciucm channel blockers. Also, it stated how to treat gingival overgrowth if it does occur, and relevant statistics that addressed who was most likely to have th side effect of gingival overgrowth. This article also presented high levels of evidence (1a) and the authors had no conflicts of interest. The article also reviewed only articles that involve humans with no in vitro, no animals, and no case studies.

Article(s) Synopsis:

Article 1 – Is dental plaque the only etiological factor in Amlodipine induced gingival growth? A systematic review of evidence.

- **Calcium channel blockers are the most common antihypertensive agents prescribed (37%). Amlodipine is used alone or in combination. Usually require lifelong administration and a common side effect is gingival overgrowth.**
- **Amlodipine has the lowest chance of gingival overgrowth of the most commonly used Calcium channel blockers. Age, genetics, drug variables, and pre-existing gingival inflammation all influence response of gingiva to calcium channel blockers.**
- **Results:**
- **Of the 2 studies that had a dosage of 2.5mg/day only 1 of 2 had gingival over growth. Both the 5mg/day and 10mg/day dosage had all patients with gingival overgrowth.**
- **The time taking the amlodipine ranged from 6 months to more than 9 years, but found no statistically significant association between dosage and duration of the drug and gingival overgrowth**
- **The main risk factors identified for gingival overgrowth was poor oral hygiene and plaque index. Another association was found with pocket depth and clinical attachment loss and gingival overgrowth.**

- **Discussion: while amlodipine has a history of low gingival overgrowth (1.7-3.3%), this study suggests a higher percentage (26.7%)**
- **Mean age of GO occurrence was 4^{th} – 5^{th} decade of life**
- **But GO was higher in males than females**
- **Calcium channel blockers will concentrate more in areas of inflammation where they produce direct effects on gingival keratinocytes.**
- **Most common drug to replace a calcium channel blocker like amlodipine is an ACE inhibitor.**
- **The better the oral hygiene then the gingival overgrowth can be prevented.**

Article 2 – The efficacy of three different surgical techniques in the management of drug induced gingival overgrowth

- **Surgical intervention is the most frequent management strategy for drug induced gingival overgrowth**
- **Recurrence of gingival overgrowth after surgery is 34%**
- **Also require repeated surgical interventions to restore gingival contour**
- **Scalpel gingivectomy is considered standard treatment of choice**
- **But flap surgery potentially removes the disadvantages of large unprotected intra oral wound and less post op discomfort and bleeding**
- **Laser gingivectomy is a newer option that offers advantages of sterilization of the surgical field and reduced haemmorhage during excision. Also there is possibility of prompt healing and minimal post op discomfort**
- **There has not been a study done to compare these methods**
- **The outcome was primarily measured based on the recurrence of gingival overgrowth**
- **There was no significantly statistical difference of gingival overgrowth between flap surgery and scalpel gingivectomy at 6 months post surgery, but after 1 month after surgery the scalpel gingivectomy was higher for regrowth**
- **The second phase of gingival overgrowth recurrence was statistically significantly higher in patients under going scalpel gingivectomy when compared with laser gingivectomy at 1, 3, and 6 months**
- **6 months post op the plaque index of flap treated surfaces were higher than those of scalpel treated surfaces and the laser gingivectomy had a statistically significant higher plaque index than the scalpel gingivectomy**
- **Bleeding scores were higher in scalpel when compared to flap**
- **And scalpel was higher than laser for bleeding points post op**
- **More pain post op after flap than scalpel but laser and scapel were equal**
- **Discussion:**
- **Part 1 showed less gingval overgrowth following flap procedure than scalpel gingivectomy, which may be due to the flap surgery removing more of the**

interproximal tissue than the gingivectomy. Differences in periodontal variables are likely a reflection of the overgrowth recurrence. Change in gingival contour results in more plaque retention and inflammation from overgrowth results in increased pocket depths.

- **Part 2 showed that laser surgery had a significant impact on rate of recurrence of gingival overgrowth compared to scalpel gingivectomy. The rate of gingival change 1-3 months was less than scalpel, but the rate was the same in months 3-6. Laser has lest post op discomfort but more pain than scalpel. Laser also has better hemorrhage control.**

Levels of Evidence: (For Therapy/Prevention, Etiology/Harm)
See http://www.cebm.net/index.aspx?o=1025

☒ **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
☐ **1b** – Individual RCT
☐ **2a** – Systematic Review of Cohort Studies
☐ **2b** – Individual Cohort Study
☐ **3** – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research
☐ **4a** – Systematic Review of Case Control Studies
☐ **4b** – Individual Case Control Study
☐ **5** – Case Series, Case Reports
☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
☐ **7** – Animal Research
☐ **8** – In Vitro Research

Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews
See article **J Evid Base Dent Pract 2007;147-150**

☐ **A** – Consistent, good quality patient oriented evidence
☒ **B** – Inconsistent or limited quality patient oriented evidence
☐ **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

Conclusion(s):

Gingival overgrowth can be controlled/prevented in patients on calcium channel blockers in two main ways. The first is a preventative. The articles found a relation between plaque index/oral health as the two main risk factors to develop gingical overgrowth when on CCBs. When plaque index is controlled and the patient has good oral hygiene then the chances of gingival overgrowth are low. If gingival overgrowth already exists, then surgery is the standard option to remove the hyperplasia gingival tissue. But recurrence is high at 34%. Laser gingivectomies is a newer option and produces better first few months result,

less gingival overgrowth recurrence than the current standard of scalpel gingivectomies has better heme control. More exploration/research needs to be done on lasar gingivectomies.