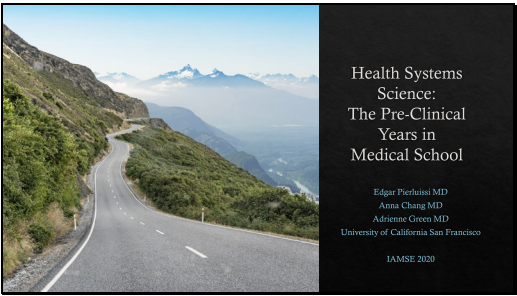
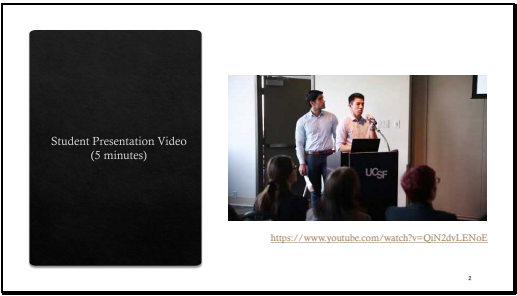


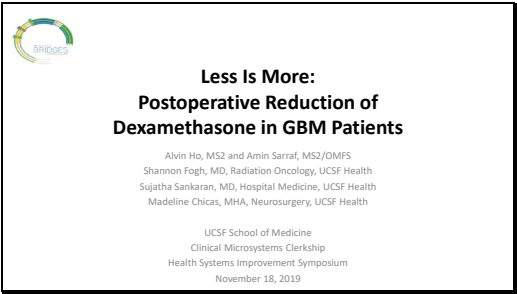
Slide 1



Slide 2



Slide 3



Slide 4



Background

- Corticosteroid therapy (especially dexamethasone) has been a standard treatment since the 1960s to reduce peritumoral edema following craniotomy.
- However, there is no human data to support this practice
- There are currently no evidence-based guidelines for administering steroids in craniotomies post-operatively

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Corticosteroids have long been used to reduce peritumoral edema following craniotomy for brain tumors. Despite this common practice, most data we have to support steroid use has been in mouse models – there are no evidence-based clinical trials studying steroid use post-operatively

Slide 5



Adverse Effects of Steroids

- Occur with prolonged use of high doses
- Cushing's disease

Psychiatric

- Sleep disturbance/activation
- Mood disturbance
- Psychosis

Skin/soft tissue

- Cutaneous atrophy
- Abdominal striae
- Hypertrophy
- Cystitis

Neurologic

- Neuropathy
- Myelodilatator conduction

Cardiovascular

- Hypertension

Metabolic

- Hyperglycemia
- Neuropathy of bone
- Myopathy

Endocrine

- Adipose metabolism
- Adrenal cortex suppression

Immunologic

- Lymphopenia
- Immune suppression
- False negative skin test

Ophthalmic

- Cataract
- Myopia

Ophthalmic

- Cataract
- Myopia

Developmental

- Growth retardation

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In addition, side effects of prolonged steroid use including diabetes, hypertension, and insomnia are often observed.

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Background

- At UCSF, there is a longstanding practice of treating postoperative brain tumor patients with a 17-day dexamethasone taper starting with 4 mg four times daily.
- A recent trial found that a 10-day dexamethasone taper starting at 4 mg twice daily led to a significant reduction in the incidence of new or worsened hypertension
- At UCSF, starting with a higher initial dose leads to a 4x higher cumulative dose over the course of their taper.

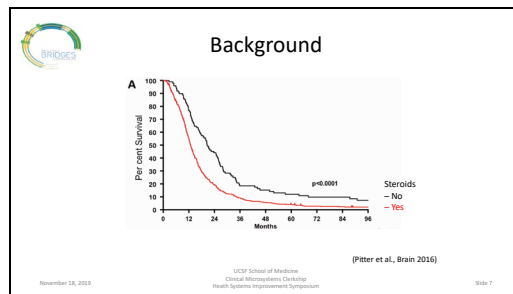
(Brodeur et al., World Neurosurgery 2019)
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Side effects of steroids are related to cumulative dose and duration of therapy however, there is a paucity of evidence regarding the optimal dosing of dexamethasone in postoperative neuro-oncology patients.¹² As a result, there is significant variability in treatment practices.¹³

At UCSF, there is a longstanding practice of treating postoperative brain tumor patients with a 17-day, high dose dexamethasone taper in the immediate postoperative setting. This taper is initiated with 4 mg four times daily.

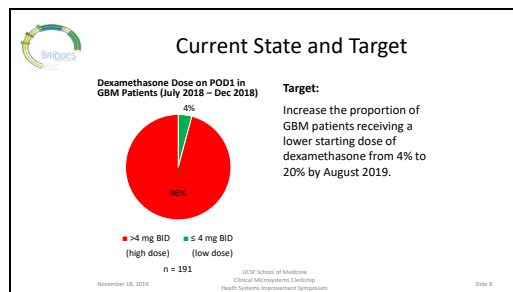
At UCSF, starting with a higher initial dose leads to a 4x higher cumulative dose over the course of their taper.

Slide 7



This is graph showing the impact on survival of patients with GBM who received corticosteroids during their treatment course. This new data is now suggesting that steroids may influence over all survival in cancer patients hypothesized to be due to their immunosuppressive effects.

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In order to understand the current state, we analyzed 191 charts to evaluate the number of patients receiving the UCSF standard post operative steroid dose vs a lower dose of steroids.

We found that only 4% of patients had received the lower steroid dose.

Based on this we created a SMART goal to increase the proportion of patients receiving a lower dose of steroids following craniotomy to 20% by August 2019.

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Gap Analysis

Interviews with one nurse practitioner, one neurosurgery resident, three neurosurgery attendings, and four patients revealed the following:

- Providers were not aware that they were over-prescribing steroids
- Concern that reducing the dosage of steroids would compromise patient care
- All four patients reported multiple negative side effects such as mood changes, headaches, nausea, and trouble sleeping
 - One patient was in steroid-induced psychosis

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We interviewed one neurosurgery resident, one nurse practitioner, and four patients about their experience with steroids postoperatively. Based on these interviews, we identified several motifs indicative of root causes of the barriers to implementing this new pathway. Most notably, there seems to be inconsistency in provider awareness of the new pathway, as well as provider resistance to adopting the changed order set. Some of this resistance to adoption lies in clinical management of more severe disease. For example, patients with GBM may have an indication for higher doses of dexamethasone than patients with bone metastasis. In addition, attendings have different personal preferences in dosing dexamethasone due to risk of infection, seizure, or insomnia. Patients have also reported multiple negative side effects such as mood changes, headaches, nausea, and trouble sleeping. One patient was also in the middle of a steroid-induced psychotic episode when we interviewed them.

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Interventions

- A new postoperative order set was launched in Jan 2019
- This created an opportunity for physicians to choose a lower postoperative dexamethasone dose rather than default to the standard higher dose
- Education campaign to raise awareness and encourage usage of the new order set
 - Created flyers to promote new order set
 - Spoke individually with neurosurgery residents and attendings about the potential impact of steroids on their patients

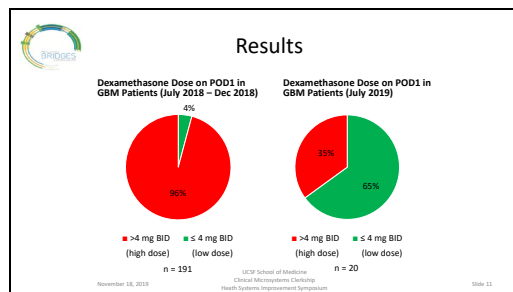
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Interventions included a new order set that was launched in 2019

Allowed physicians to choose to prescribe a lower dose of dexamethasone postoperatively instead of being restricted to the default higher dosage of steroids

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To assess the impact of our interventions, we did a chart biopsy of 20 GBM patients from July 2019. Our target goal was to increase the proportion of patients receiving a lower dose of steroids from 4% to 20%.

When we completed our chart biopsy, we found that nearly two-thirds of the patients received a lower starting dose of steroids, which far exceeded our expectations.

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Takeaway Points

- Lessons learned:
 - Simple interventions such as promoting the use of a surgical order set can lead to impactful changes
 - One on one interviews discussing data with residents and attendings may result in more patient-centered care and better outcomes

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However, many providers expressed interest in changing their practice if presented with evidence-based data showing that lower steroid dosage would lead to the same or better outcomes for patients.

The Department of Neurosurgery was extremely receptive to looking at data and using it to inform their clinical practice, and we really appreciated their cooperation and patience.

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