

Interference of Psychotropic Medications (Antidepressants, Antipsychotics, and Benzodiazepines) on the Response to Penicillin Skin Test Histamine Positive Control



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Background

- Approximately 10% of inpatients at Lions Gate Hospital (LGH) report a penicillin allergy; however, studies show that when tested, 90% of patients reporting a penicillin allergy have a negative penicillin skin test (PST). The negative predictive value of the PST is >99% and can effectively rule out penicillin Type 1 hypersensitivity reactions.
- Evidence shows that psychotropic drugs such as antidepressants, antipsychotics and benzodiazepines have varying histamine (H1) blockade. This may interfere with the histamine positive control and render the test indeterminate.
- With limited data, the screening and management of psychotropic drugs with respect to the PST remains unstandardized.

Objective

- This study aims to examine histamine blockade through interference with the PST histamine positive control in PST tested patients taking psychotropic medications in order to improve screening processes and resource utilization.

Methods

- Design:** Retrospective chart review of electronic medical records at Lions Gate Hospital (LGH).
- Study period:** Apr 2018 – Jul 2019.
- Inclusion Criteria:** All patients who had been ordered a PST Power Plan at LGH during the chart review period.
- Exclusion Criteria:** Any patients who did not receive the PST.
- Study Content:** Drug regimens (dose, route, frequency) of selected psychotropics (antidepressants, antipsychotics and benzodiazepines) were recorded. Chart notes were used to assess the primary outcome of histamine positive control result (skin prick and intradermal).

Results

Figure 1: Study Flow Diagram

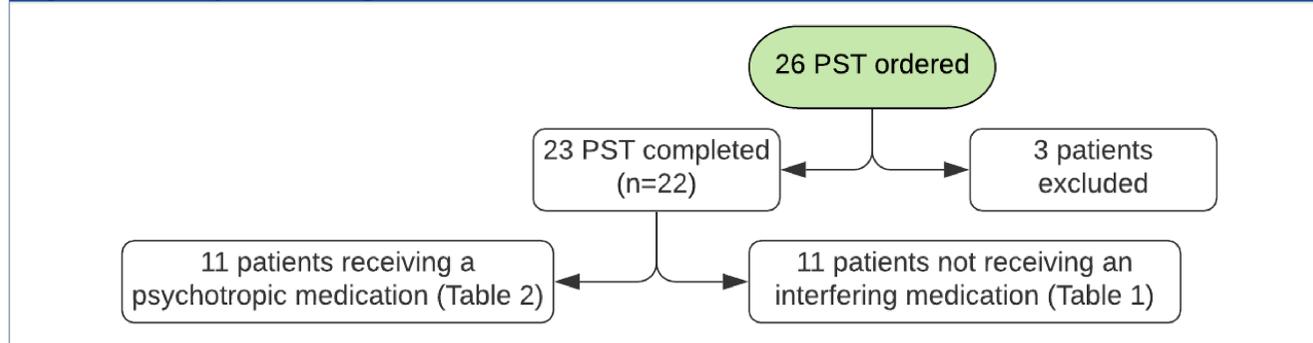


Table 1: Penicillin Skin Test Results of Patients Not Receiving an Interfering Medication (n=11)

Number of Patients	Skin Prick		Intradermal		PO Amoxicillin Challenge	Outcome
	Histamine Control	Penicillin	Histamine Control	Penicillin		
7	⊕	⊖	⊕	⊖	⊖	⊗
4	⊖	⊖	⊕	⊖	⊖	⊗

Table 2: Penicillin Skin Test Results of Patients Receiving a Psychotropic Medication (n=11)

Concurrent Meds	Interfering Meds On Hold	Skin Prick		Intradermal		PO Amoxicillin Challenge	Outcome
		Histamine Control	Penicillin	Histamine Control	Penicillin		
Lorazepam		⊕	⊖	⊕	⊖	⊖	⊗
Mirtazapine		⊕	⊖	⊕	⊖	⊖	⊗
Duloxetine	Hydroxyzine Betamethasone Cannabis oil	⊕	⊖	⊕	⊖	⊖	⊗
Amitriptyline		⊖	⊖	⊖	⊖	N/A	?
	Amitriptyline*	⊖	⊖	⊕	⊖	⊖	⊗
Duloxetine, Nortriptyline		⊕	⊖	⊕	⊕	⊕	⊙
Clonazepam	Benadryl	⊕	⊖	⊕	⊖	⊖	⊗
	Ranitidine	⊕	⊖	⊕	⊖	⊖	⊗
Clobazam		⊕	⊖	⊕	⊖	⊖	⊗
Escitalopram		⊕	⊖	⊕	⊖	⊖	⊗
Duloxetine, Clonazepam, Bupropion, Quetiapine	Hydrocortisone (oral)	⊖	⊖	⊕	⊖	⊖	⊗
Venlafaxine		⊕	⊖	⊕	⊖	⊕	⊙

Legend	⊕ Expected, positive histamine response, wheal >3mm	⊖ Expected, negative penicillin response	⊗ Negative penicillin allergy
	⊖ Unexpected, negative histamine response, wheal <3mm	⊕ Unexpected, positive penicillin reaction	?
			⊙ Positive Type 1 penicillin allergy

*One patient received two PSTs (once while on amitriptyline and again after holding amitriptyline for 2 weeks)

Positive Oral Challenge

- The clinical need to rule out a penicillin allergy outweighed the possibility of an active allergy in the two patient cases where the PST results confirmed a Type 1 IgE allergy.
- A shared decision was made to proceed with a penicillin oral challenge despite the possibility of a positive penicillin allergy

Limitations

- Our sample size was small (n=22) and may not be representative of the study population. Therefore, results may have limited generalizability.
- The negative skin prick histamine control results may be explained by weaker antihistaminic drug properties, insufficient amount of histamine in the skin prick component of the PST or interpatient variation. LGH uses a histamine concentration of 0.1mg/ml in skin prick component. Some sites use a higher concentration of 1mg/ml.

Conclusions

- Similar rates of patients (3/11 on a psychotropic, 4/11 not on any interfering med) had a negative histamine control skin prick, indicating it may not be due to medication interference but rather an insufficient amount of histamine in the skin prick component of the PST or interpatient variation (See Limitations).
- Even if the skin prick histamine control is negative, a patient may still be able to mount an appropriate histamine response to the intradermal step.
- Only one patient (on amitriptyline 10mg daily) demonstrated sufficient medication interference that necessitated stopping the PST early. When re-tested after holding amitriptyline for 2 weeks, the PST results did not indicate significant medication interference.
- Our results support that holding TCAs for 2 weeks is sufficient to avoid interference with histamine control.
- Continuing other psychotropic medications (SSRIs, SNRIs, bupropion, mirtazapine, or BZDs) does not appear to jeopardize PST results.
- Further analysis is needed to assess the level of histamine blockade by individual psychotropic drugs.