

SIRVA (Shoulder Injury Related to Vaccine Administration) A Case Series — Are you 'On Target'?

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Background

Shoulder pain can be described as a transient side effect of vaccine administration. In some cases, acute onset of shoulder pain and limited range of movement may suggest local injury to structures within the shoulder joint.

Shoulder Injury related to Vaccine Administration (SIRVA) has been described in literature as a rare complication of incorrect vaccine administration causing an immune-mediated inflammatory reaction locally within the shoulder joint.^{1,2,3}

SIRVA described in the literature includes: bursitis, tendonitis, rotator cuff tears and fluid accumulation in the deltoid or rotator cuff. Bursitis of the shoulder joint is one of the more common clinically reported diagnosis, usually confirmed by ultrasound.

SAEFVIC (Surveillance of Adverse Events Following Vaccination in the Community) collect, analyse and report information about significant Adverse Events Following Immunisation (AEFI) as part of monitoring vaccine safety in Victoria.

Methods

We reviewed the SAEFVIC database for SIRVA, including bursitis reported to SAEFVIC. Data was extracted from the SAEFVIC database (2007–2016).

Diagnostic criteria for bursitis

Clinically diagnosed on ultrasound or by relevant health practitioner i.e. physiotherapist or GP.

Definition of bursitis

Bursae are small fluid filled sacs located between 2 adjoining structures that aid in reducing friction and assist in movement of tendons over bony surfaces. Inflammation of the bursae, called bursitis, can cause localised pain, pain worsened by movement, stiffness and increased pain at night.

Results — Case Series

There have been 8 clinically confirmed cases of bursitis secondary to incorrect vaccine administration reported to SAEFVIC between 2007 and 2016.

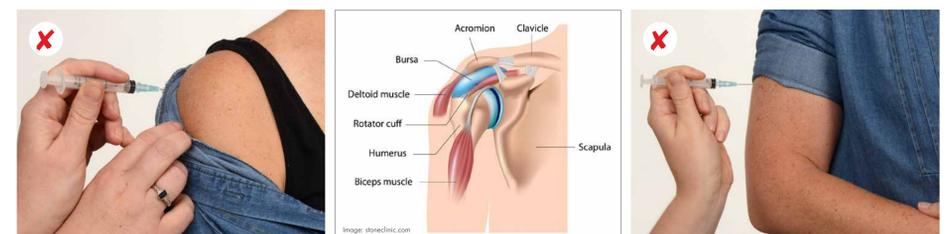
Case	Vaccine	Onset of symptoms	Description of reaction (as per SAEFVIC report)	Investigations	Diagnosis	Management/treatment	Outcome
1	Human Papilloma Vaccine (Gardasil dose 1)	6 hours	Fainted, high injection site noted just lateral to acromion, severe left shoulder pain lasting >10 days	Ultrasound	Impingement syndrome, sub-acromial bursitis	GP review, ultrasound	Unknown
2	dTpa (Boostrix)	1 minute	Immediate pain felt after vaccination, pain increased and shoulder movement decreased over next 10 days	Ultrasound	Sub-acromial bursitis	Emergency visit given Ketorolac injection and Endone Ultrasound Anti-inflammatories Sports physician Cortisone injections and hydro-dilation of shoulder	Symptoms lasted >4 weeks
3	Trivalent Influenza (Vaxigrip)	Immediate	Sore arm at injection site for 2 weeks For 2 weeks following, pain increased travelling into shoulder Heat at injection site	Ultrasound	Bursitis	GP Physiotherapy Cortisone injections	Symptoms lasted >2 weeks Time off work
4	dTpa (Boostrix)	Immediate	Arm pain continued to worsen over the next few days Unable to lift arm above shoulder for the following week	Ultrasound	Bursitis	GP Cortisone injections	Symptoms lasted >1 week Time off work
5	dTpa (Boostrix)	1 day	Achy arm, hard to lift arm up, pain extending through shoulder, injection site reported high near shoulder	Ultrasound	Bursitis	GP Physiotherapy	Symptoms lasted >4 weeks
6	dTpa (Boostrix — antenatal at 36 weeks gestation)	1 day	Significant pain in shoulder, unable to lift arm, at time of injection felt a 'crunch', pain lasted >2weeks	Ultrasound	Mild sub-acromial/sub-deltoid bursitis	GP SAEFVIC appointment	Symptoms lasted >2 weeks Delivered baby prior to SAEFVIC appointment No further follow up
7	Tri-valent Influenza (Fluarix)	1 hour	Pain radiating up into left shoulder Decreased range of movement in arm	Ultrasound	Acute bursitis	Emergency department Ultrasound Rheumatologist Hydrocortisone injections	Pain lasted > 2 weeks
8	Quadrivalent Influenza (FluQuadri)	Immediate	Significant pain in arm and shoulder where vaccinated Reported that nurse had trouble pushing vaccine into muscle very high in shoulder Difficulty lifting arm	Ultrasound	Bursitis	GP Physiotherapy Anti-inflammatory medications	Ongoing — time off work, pain persisting >4 weeks

Recommended Vaccine Administration Techniques

- As per the Australian Immunisation Handbook⁴
- Children ≥12 months of age, adolescents and adults
- To locate the deltoid site for injection:
 - Expose the arm completely, from the top of the shoulder to the elbow; remove the shirt/clothing if needed.
 - Locate the shoulder tip (acromion) and the muscle insertion at the middle of the humerus (deltoid tuberosity).
 - Draw an imaginary inverted triangle below the shoulder tip, using the identified anatomical markers.
 - The deltoid site for injection is halfway between the acromion and the deltoid tuberosity, in the middle of the muscle (triangle).
 - More than 1 vaccine may be given into the deltoid muscle ensuring the deltoid mass is adequate and each vaccine is separated by 2.5cm.



Incorrect vaccine techniques — too high and too low



Implications of SIRVA

- Pain
- Decreased range of movement in affected limb
- Medical intervention
- Time off work
- Uncertainty around immunogenicity
- Uncertainty regarding long term joint damage

Take Home Messages

To avoid causing a shoulder injury related to vaccine administration:

- Ensure you can visualise the deltoid from the shoulder to the elbow.
- Be familiar with the anatomical landmarks and surrounding structures.
- Follow recommended immunisation administration techniques.
- Aim for the middle of the deltoid.
- Do not inject too high (near the acromion process) or too low near the insertion of the deltoid.
- For appropriate assessment, management and follow up report any suspected cases of SIRVA to SAEFVIC (Victoria only) online at <https://www.saeftvic.org.au> or by phone 1300 882 924 (Option 1).

References

- Atanasoff S, Ryan T, Lightfoot R, Johan-Liang R. Shoulder injury related to vaccine administration (SIRVA). *Vaccine*. 2010;(51):8049–8052.
- Bodor M, Montalvo E. Vaccination-related shoulder dysfunction. *Vaccine*. 2007;25(4):585–587.
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