

Radiation Synovectomy in inflammatory arthritis

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Radiation synovectomy is
contraindication in infected joints

- The first synovectomy was performed in
septic arthritis 1952

Risk of malignancy is low

- One reported case of hematologic malignancy with the use of ^{198}Au
J Rheumatol 1991 Lipton et al.

198Au- colloid was administered in
size of 0.1 μm

- The incidence of leakage of injected dose observed with this was as high as 48%
- Later on colloid particle size between 5 and 15 μm were used

Important aspects

- Local treatment
- Palliative form of treatment
- Should be performed by Nuclear medicine expert –keeping in view radiation safety
- Not used in infected joints, mechanically unstable joints.

Three broad categories

- Inflammatory- RA, Psoriatic, PVNS etc
- Hemophilic
- Osteoarthritis

Advantage of radiation synovectomy

- Local treatment
- OPD basis
- Prevents recurrent episodes of bleeding
- Delays the onset of joint deformity
- Economical option Vs factor viii

Preliminary evaluation

- Plain radiograph
- Joint fluid analysis
- Complete hemogram
- Serum analysis for inhibitors
- Blood sugar in Diabetic patient –strict control needed
- Systemic steroids –preferably put off.

Cartilage

- Radioresistant because it is relatively hypoxic

Ideal radio-isotope

Beta emitting

Medium range of penetration- good enough to burn the synovium and weak enough to prevent damage to the cartilage

Long half life

Colloid particle size 5 to 10um in size

Radioisotopes used

- 90 Yttrium
- 166 Holmium
- 153 Samarium
- 169 Erbium
- 186 Rhenium
- 32 Phosphorous

Beta T1/2 tissue range

- ^{90}Yt 0.9 2.7 days 3-10mm
- ^{186}Rh 0.3 3.8 1-4mm
- ^{169}Er 0.1 9.4 1mm
- ^{166}Ho 0.69 1.1 2-8mm
- ^{32}P 0.69 14 2-8mm

Initiated radiation synovectomy in 1998

- Thanks to Prof Moedder

- Radiation synovectomy in management of hemophilic hemarthrosis
- World congress of Hemophilia 2000

10 of 85 joints treated were hemophilic

Age range 9 to 27 years

Average requirement of factor was once in two weeks

conventional means of Rx failed

7 knees – Yttrium90

One elbow and 2 knees Rhenium186

Conclusion

- All except 2 knees Rx with rhenium responded very well
- The cost saved towards factor viii/ xi is substantial

Between 1998 and 2002

- 262 joints were treated for various disorders
- Yttrium 86
- Holmium 81
- Samarium 46
- Rhenium 39
- Erbium 10

Scoring

- Score 1 (bedridden status to performing daily activities)
- Score 2 (painful daily activities on drugs to painless activities without drugs)
- Score 3 (no change)

Categories

- A –Rheumatoid arthritis
- B –Hemophilic arthropathy
- C –Osteoarthritis
- D –Pigmented villonodular synovitis

Results

		I	II	III
•				
• A	212	82	90	40
• B	32	16	10	06
• C	15	02	05	08
• D	03	01	02	--

economics

- **Costing** : The average cost per joint using various radioisotopes were as follows:
- Yttrium : Rs 17000/-
- Rhenium Rs 12000/-
- Holmium Rs 4000/-
- Samarium Rs 4000/-
- Erbium Rs 5000/-

Cost saved in hemophilics

The reduction in bleeding episodes were 6 per month which required antihemophilic worth Rs15000/- per month approximately (taking into account that the patients use 750 units of AHF per bleeding episode).

Conclusion:

- Radiation synovectomy yields encouraging results in drug resistant Rheumatoid arthritis
- It reduces the episodes of recurrent hemorrhage in hemophilic hemarthrosis.
- It saves costs in significant percentage of hemophiliacs towards antihemophilic factor
- It is not recommended in osteoarthritis.

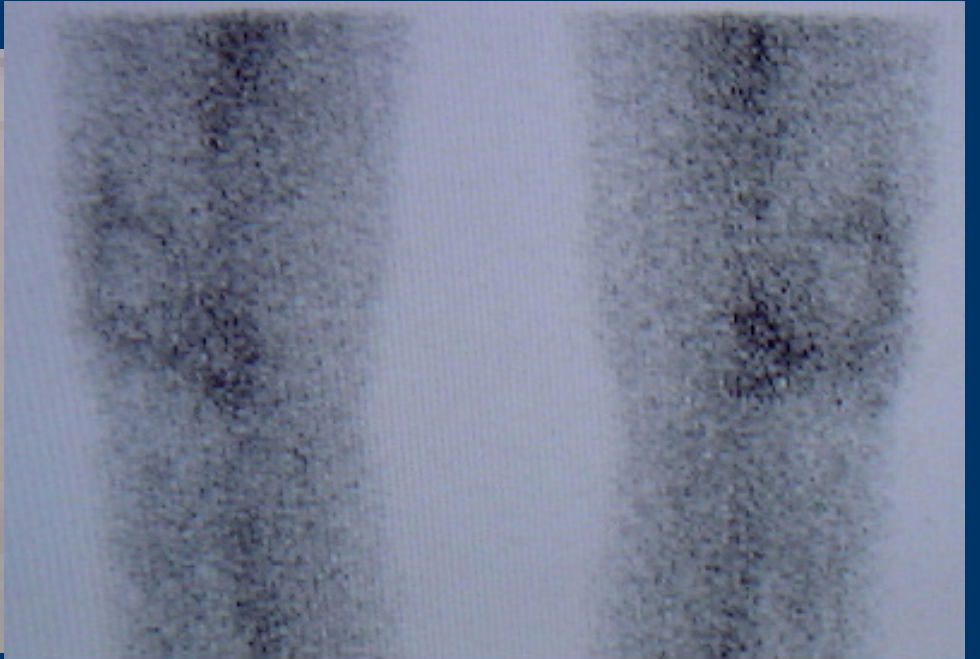
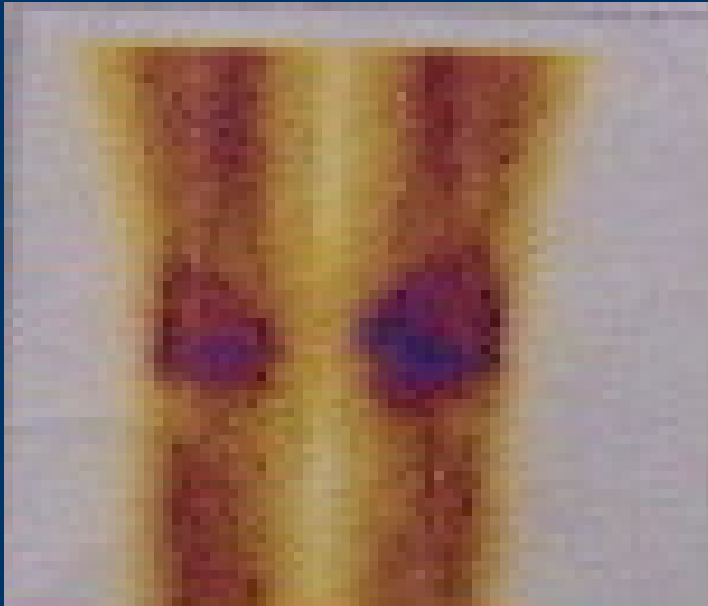
2005 BRIT introduced SMPC

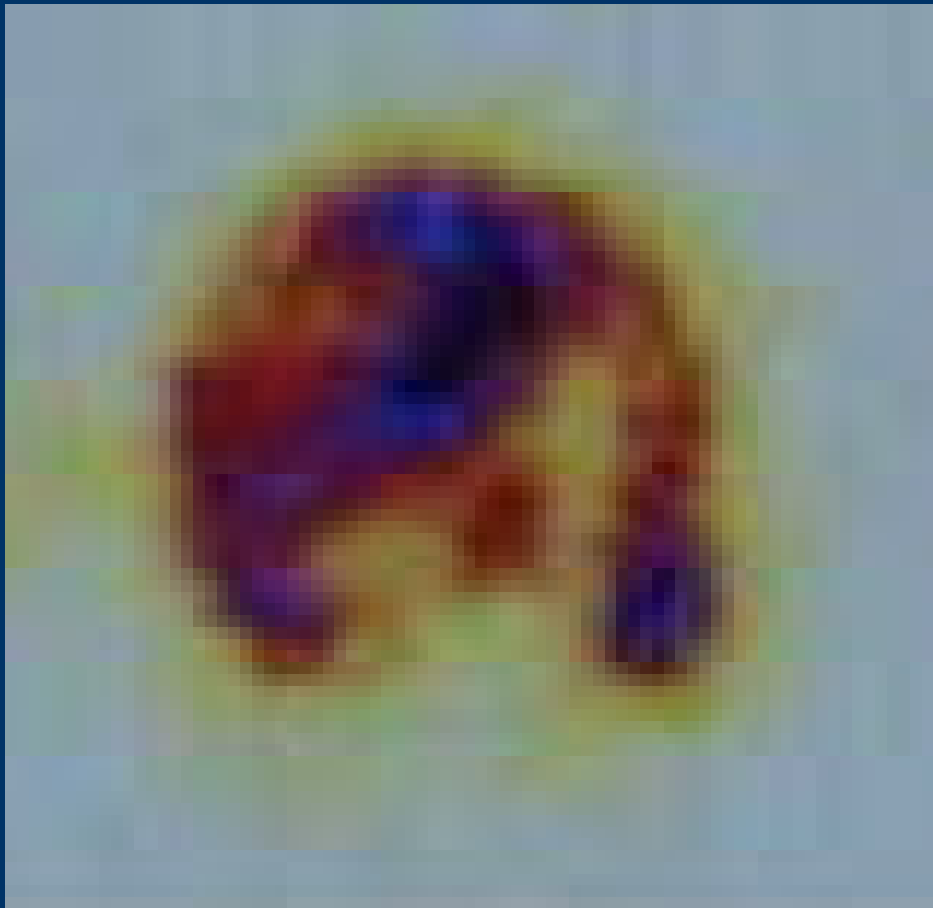
- Indigenously produced P32- colloid
- Preparation: The method of preparation involves the reaction of SmCl_3 with phosphoric acid mixed with required amount of ^{32}P - H_3PO_4 activity, followed by the addition of 3.5% gelatin (Haemaccel) solution to have true colloidal dispersion. (RC yields ~90%). The resultant colloid is then purified by dialysis.

Nov 2005 to March 2006

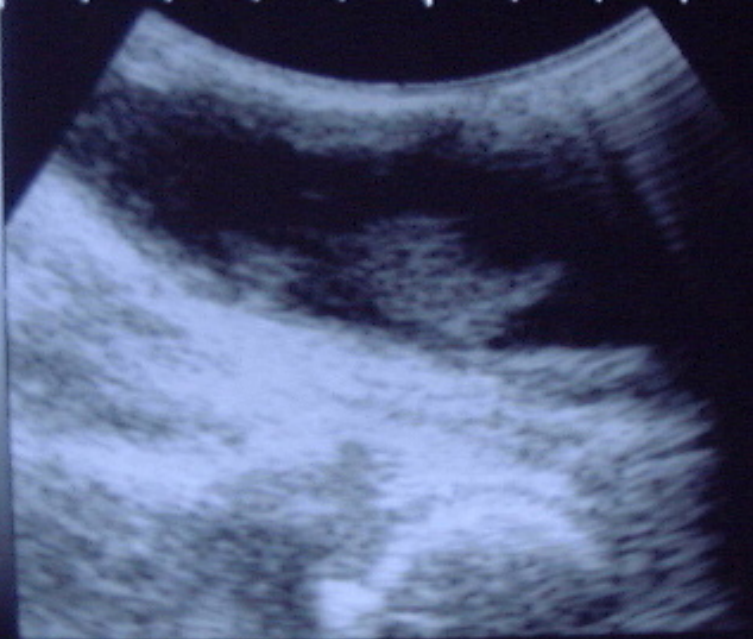
- 37 joints were treated with SMPC
- P32 colloid form
- 3 were hemophilics and others were RA group
- Conclusion: good response in all the hemophilics
- 80% of rheumatoid arthritis group had score 1 in the results.







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C96



050 DR66 D75 N-0 F-0



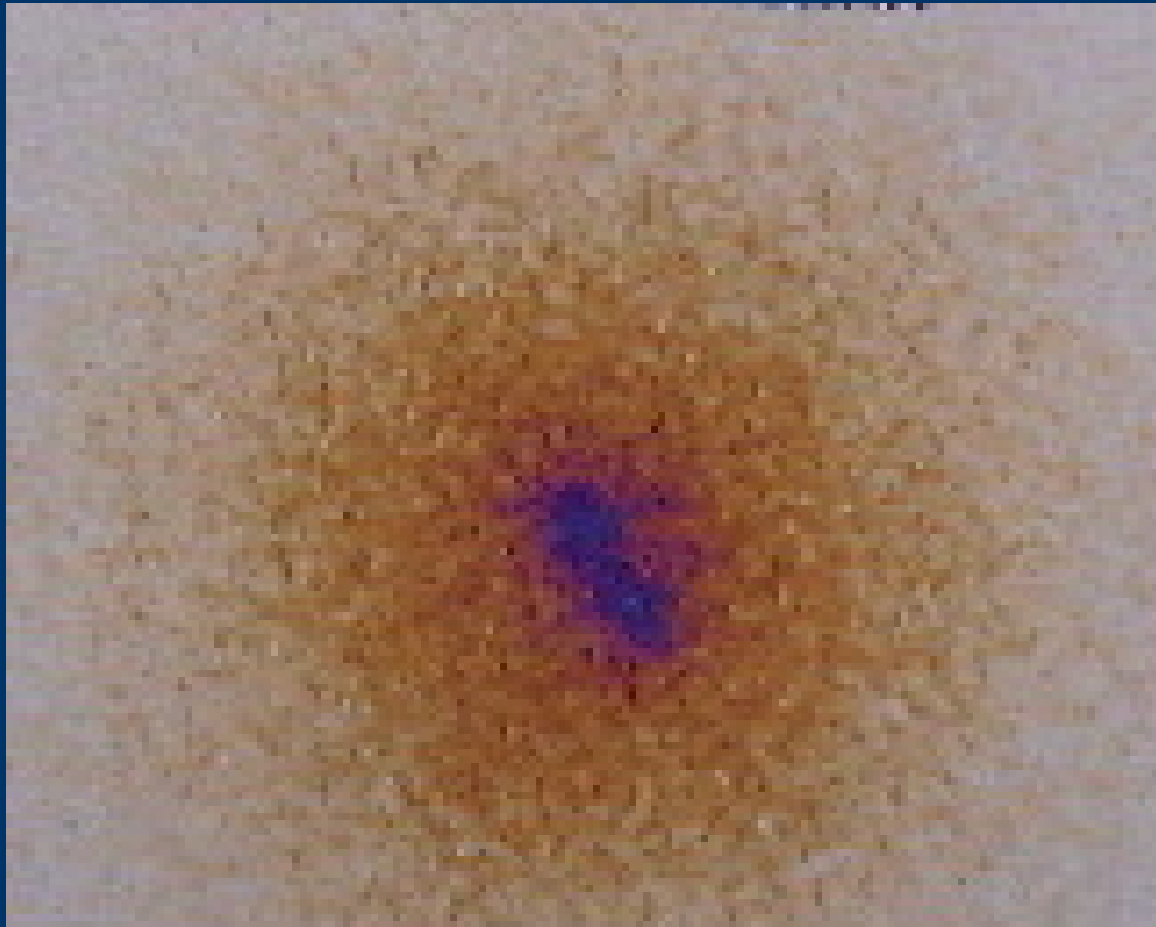
~ Power















Should you use steroids with the isotope?

- If you desire to know the correct result
DON'T USE IT.

Use of steroids locally with the isotope

- Is done to prevent radiation synovitis.
- It brings about prompt relief of symptoms
- Aggravation at 3 to 4 weeks

Imported agents

- Yttrium-90 citrate
- Rhenium-186 silicate
- Erbium-169-silicate
- Phosphorous-32 colloid

Indigenous agents developed by BARC

- Holmium-166 HA particles
- Samarium-153 HA particles
- P32 -colloid

Concerns

- Selecting the correct joint
- Making sure that the blood sugars are well under control
- Strict asepsis
- Imaging whenever needed
- Abandon the procedure if you are not certain that the needle is correctly positioned.
- Absence of synovial inflammation –write it clearly in the report.

CRP on radiosynovectomy

- Two arms in Rheumatoid arthritis group
 1. Isotope alone
 2. Steroid alone
- Two arms in Hemophilic hemarthrosis group
 1. Isotope alone
 2. Rifampicin



Radiation synovectomy in Hemophiliacs

- Economical
- Delays joint deformity
- Improves quality of life
- Reduces the risk of accidental exposure to blood products born viral diseases.

Radiation synovectomy in rheumatoid arthritis

- Local form of Rx to suppress synovitis
- Instead of increasing the dose of systemic drugs use RS to bring about relief in symptoms
- More than one joint can be treated in the same sitting.
- Joints with mechanical instability should be avoided.
- Infection is a contraindication.

Conclusion:

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Anonymous

- Most of the diseases can be cured by medicines
- Those that medicine can not cure: can be cured by knife
- Those that knife can not cure: can be cured by fire
- Those that fire can not cure: are incurable