Nurse Initiated Sequential Compression Device Application Program for Total Knee Replacement Patient

Cheung Shuk Shan, Susana
(APN,O&T, PYNEH)
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Total Knee Replacement (TKR)

TKR is a common surgical intervention for management of disability secondary to osteoarthritis of the knee. (Birchfield, 2001)

There were >150 patients with scheduled TKR done for each year.

Relationship Between DVT and TKR

- The incidence of the post-operative DVT without prophylaxis for TKR in Chinese population was 31% (Ko et al, 2003).
- DVT occurs in 29% of patients receiving LMWH as prophylaxis for TKR (Westrich et al, 2000).

Common Prophylaxis for DVT

- Pharmacological

- Mechanical

TKR and DVT in PYNEH

- In 2010 and 2011, all patients were put on pharmacological DVT prophylaxis.
- The DVT incidence:

  In 2010 = 10%

  In 2011 = 10.1%


IMPROVE
-MENT


Good
Better
Best

Assumption

A combination of LMWH and SCD may be more effective to prevent DVT in lower limbs.

Aims of the Program

- Investigate the effect of SCD in reducing the incidence of DVT on top of the pharmacological proplylaxis

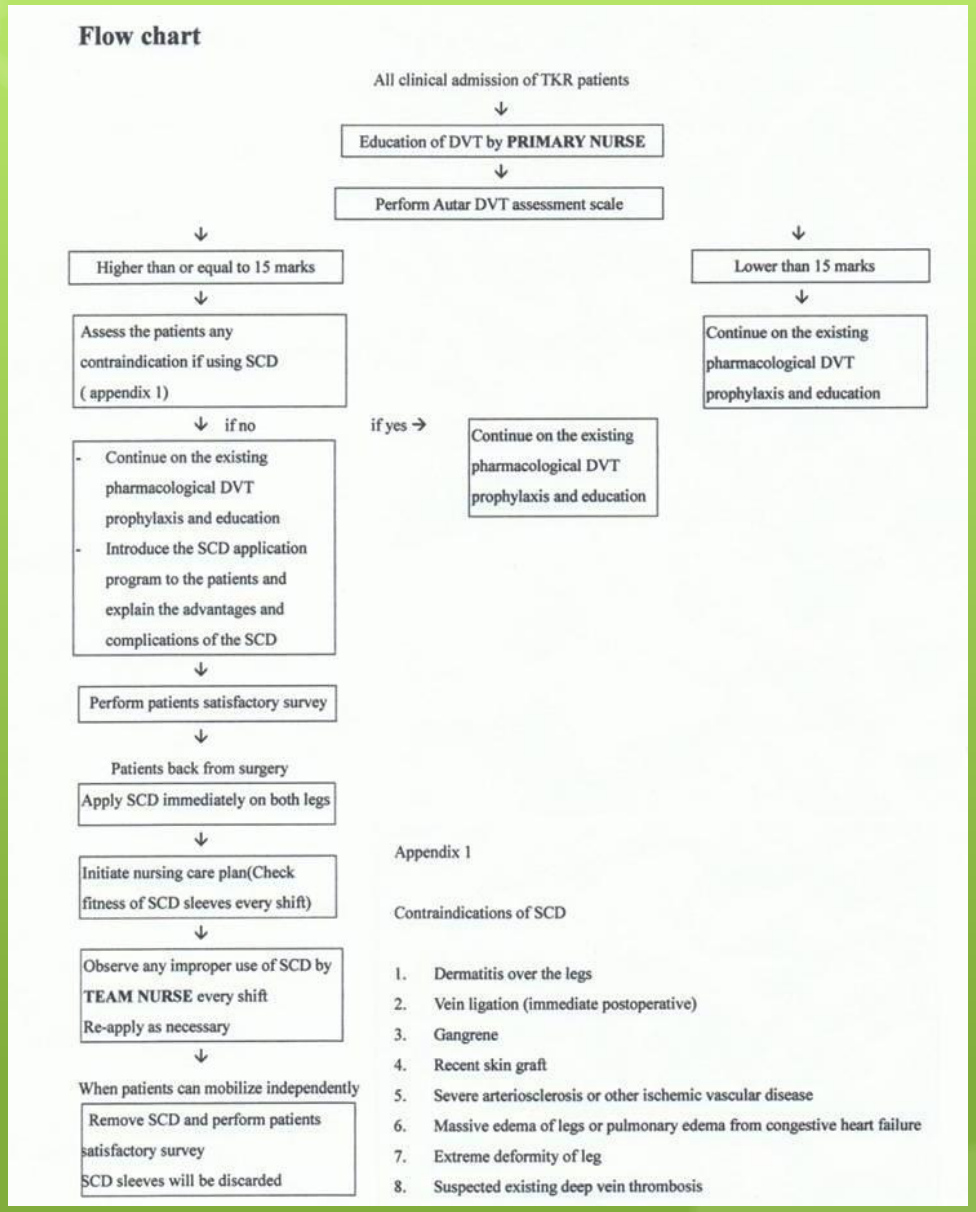
- Evaluate the level of acceptance of SCD among patients who undergone TKR

Phase 1
(10/10/2011 to 31/03/2012)

Use Autar DVT scale

Only the high risk patients who scored > 15 marks use SCD

Program Flow Chart



Flow chart

All clinical admission of TKR patients

↓

Education of DVT by **PRIMARY NURSE**

↓

Perform Autar DVT assessment scale

↓

Higher than or equal to 15 marks

↓

Assess the patients any contraindication if using SCD (appendix 1)

↓ if no

- Continue on the existing pharmacological DVT prophylaxis and education
- Introduce the SCD application program to the patients and explain the advantages and complications of the SCD

↓

Perform patients satisfactory survey

↓

Patients back from surgery

Apply SCD immediately on both legs

↓

Initiate nursing care plan(Check fitness of SCD sleeves every shift)

↓

Observe any improper use of SCD by **TEAM NURSE** every shift
Re-apply as necessary

↓

When patients can mobilize independently

Remove SCD and perform patients satisfactory survey
SCD sleeves will be discarded

if yes →

Continue on the existing pharmacological DVT prophylaxis and education

↓

Lower than 15 marks

↓

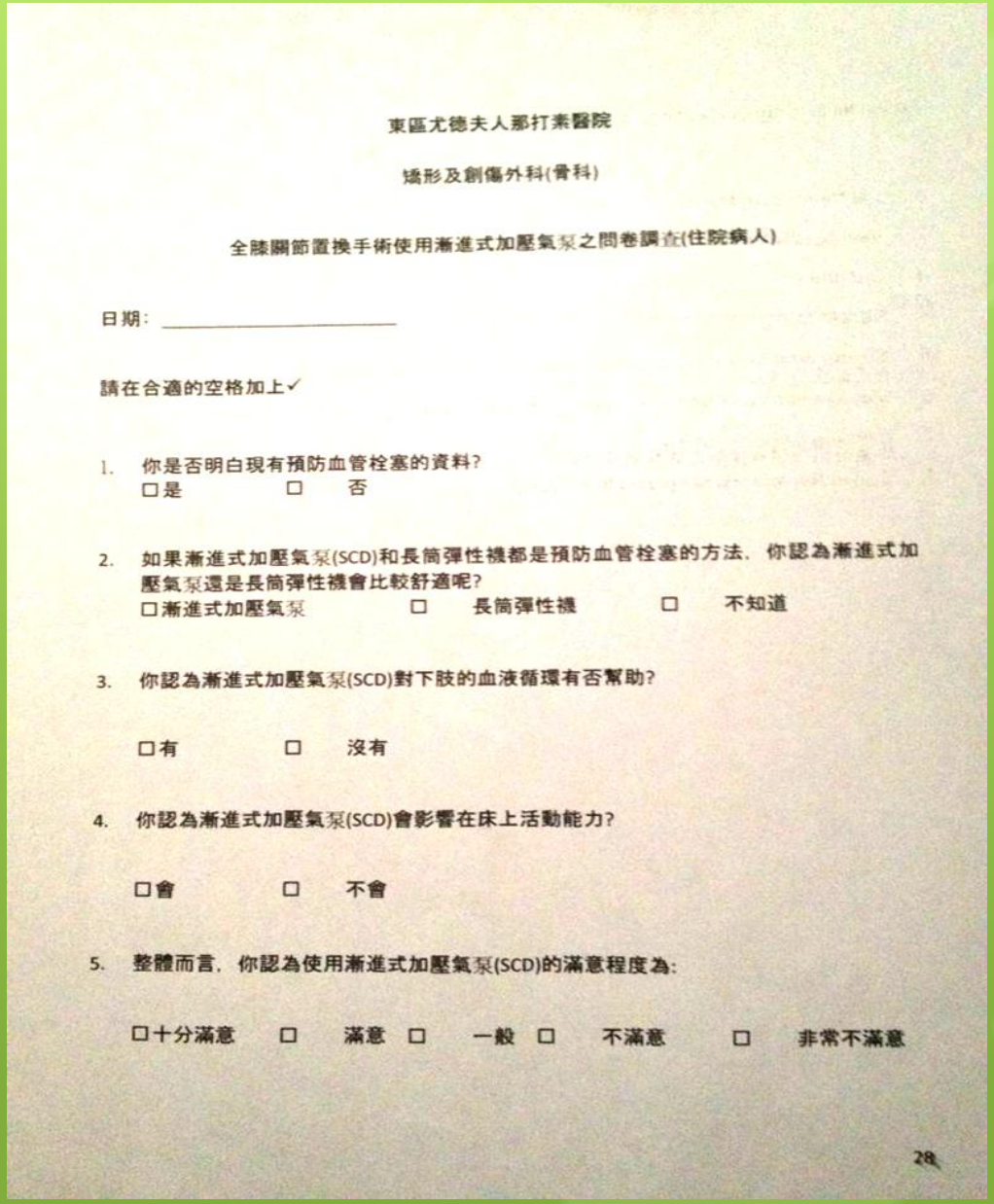
Continue on the existing pharmacological DVT prophylaxis and education

Appendix 1

Contraindications of SCD

1. Dermatitis over the legs
2. Vein ligation (immediate postoperative)
3. Gangrene
4. Recent skin graft
5. Severe arteriosclerosis or other ischemic vascular disease
6. Massive edema of legs or pulmonary edema from congestive heart failure
7. Extreme deformity of leg
8. Suspected existing deep vein thrombosis

Patient Satisfaction Assessment Form



東區尤德夫人那打素醫院

矯形及創傷外科(骨科)

全膝關節置換手術使用漸進式加壓氣泵之問卷調查(住院病人)

日期: _____

請在合適的空格加上✓

1. 你是否明白現有預防血管栓塞的資料?
   □是 □ 否

2. 如果漸進式加壓氣泵(SCD)和長筒彈性襪都是預防血管栓塞的方法，你認為漸進式加壓氣泵還是長筒彈性襪會比較舒適呢?
   □漸進式加壓氣泵 □ 長筒彈性襪 □ 不知道

3. 你認為漸進式加壓氣泵(SCD)對下肢的血液循環有否幫助?

   □有 □ 沒有

4. 你認為漸進式加壓氣泵(SCD)會影響在床上活動能力?

   □會 □ 不會

5. 整體而言，你認為使用漸進式加壓氣泵(SCD)的滿意程度為:

   □十分滿意 □ 滿意 □ 一般 □ 不滿意 □ 非常不滿意

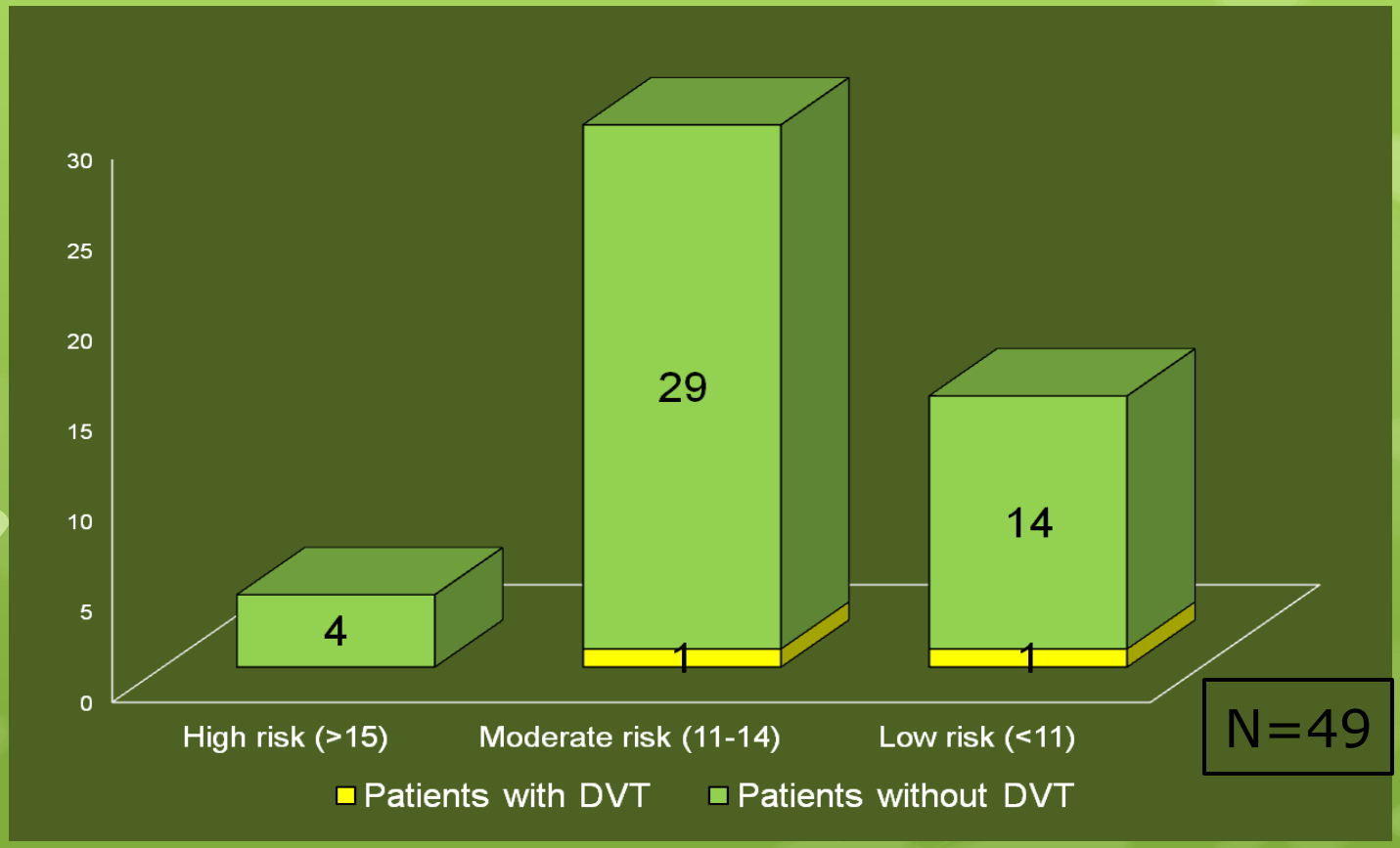
28

Results (Phase 1)
(10/10/2011 to 31/03/2012)

- 49 patients were recruited over 6 months
- 4 patients were scored high risk and put into the regime

Results (Phase 1)
(10/10/2011 to 31/03/2012)

The relationship between the risk level of DVT and the DVT incidence



Discussion

From the literature, there were quite a lot of advocates that patients receiving TKR are basically in high risk of DVT and full prophylaxis should be offered (Westrich et al, 2000 and Siu, 2012).

Discussion

- The Autar DVT risk assessment is commonly used to identify the DVT risk.

- However, it was noticed in Phase 1 of this study that the specificity and sensitivity were not good enough.

Discussion

Balance the DVT incidence and hospitalization, the expenses of SCD is worth to invest in TKR patients.

Results (Phase 2)
(1/04/2012 to 31/01/2013)

- All female and male TKR patients use SCD regardless the score in Autar DVT risk assessment scale

- 91 patients were recruited over 10 months

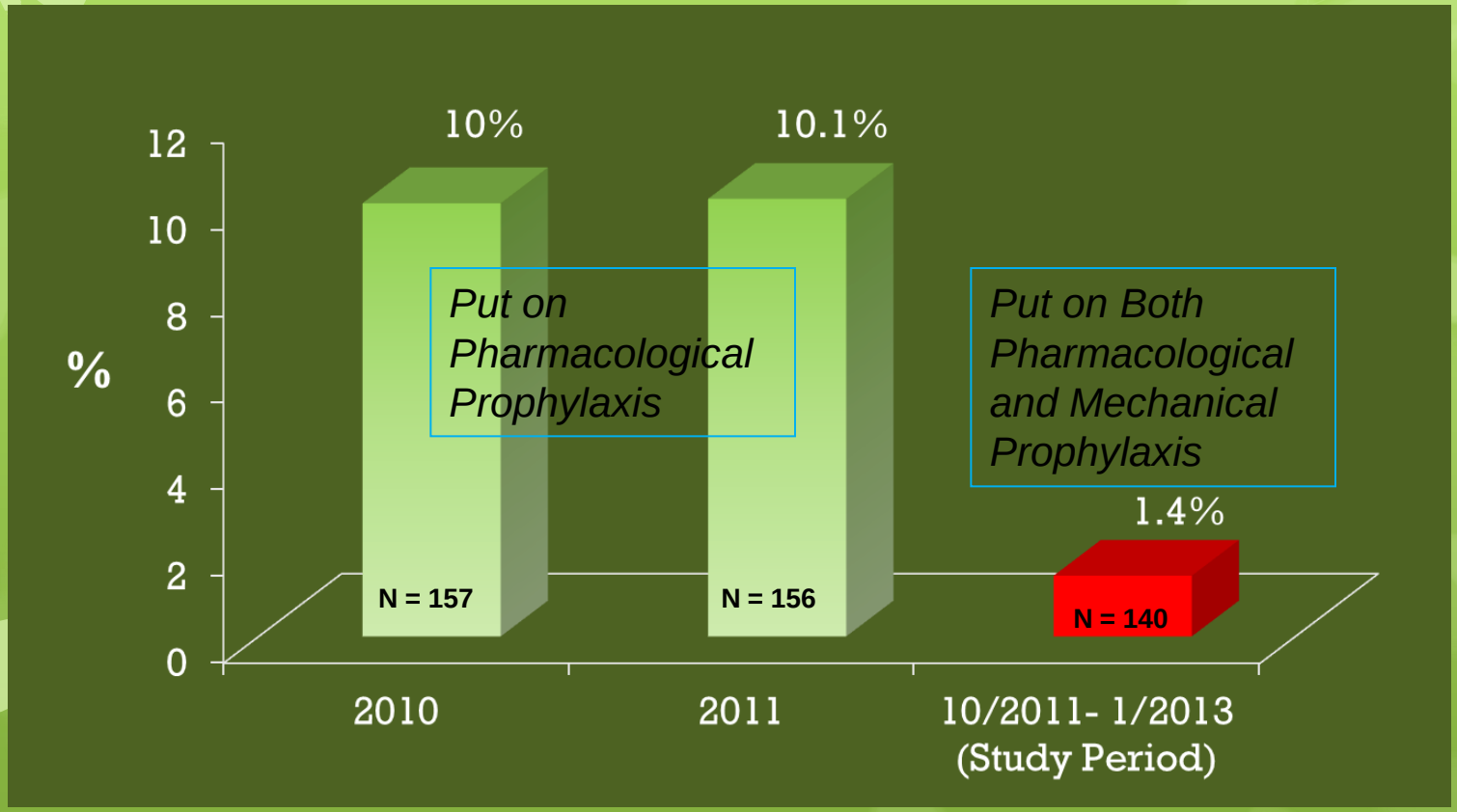
  ⇒ None of them developed DVT

Overall Results
(10/10/2011 to 31/01/2013)

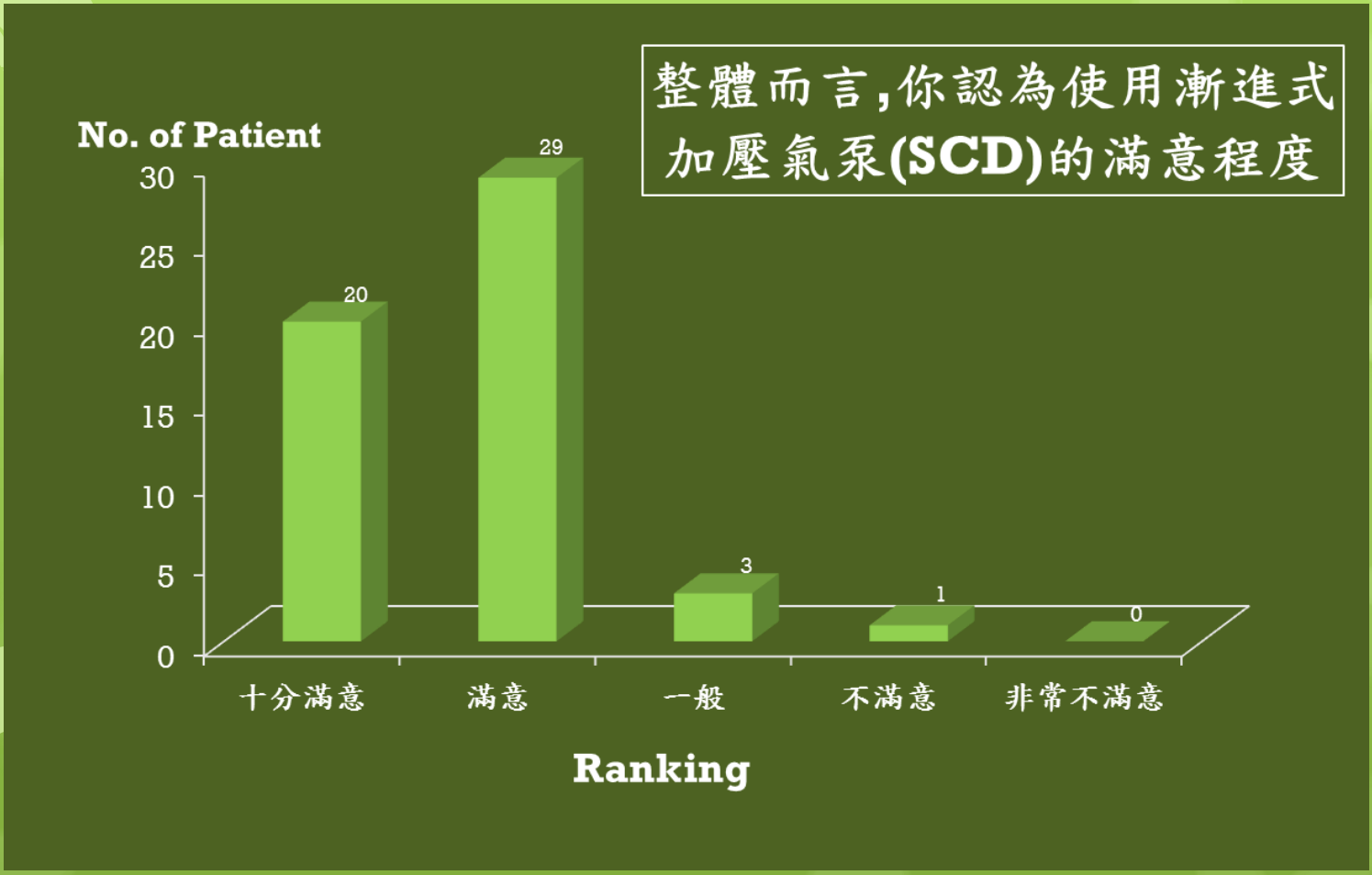
DVT incidence

	No. of patient recruited	DVT Incidence (%)
Phase 1 10/2011 - 3/2012	49	4.1
Phase 2 4/2012 - 1/2013	91	0
Overall 10/2011 - 1/2013	140	1.4

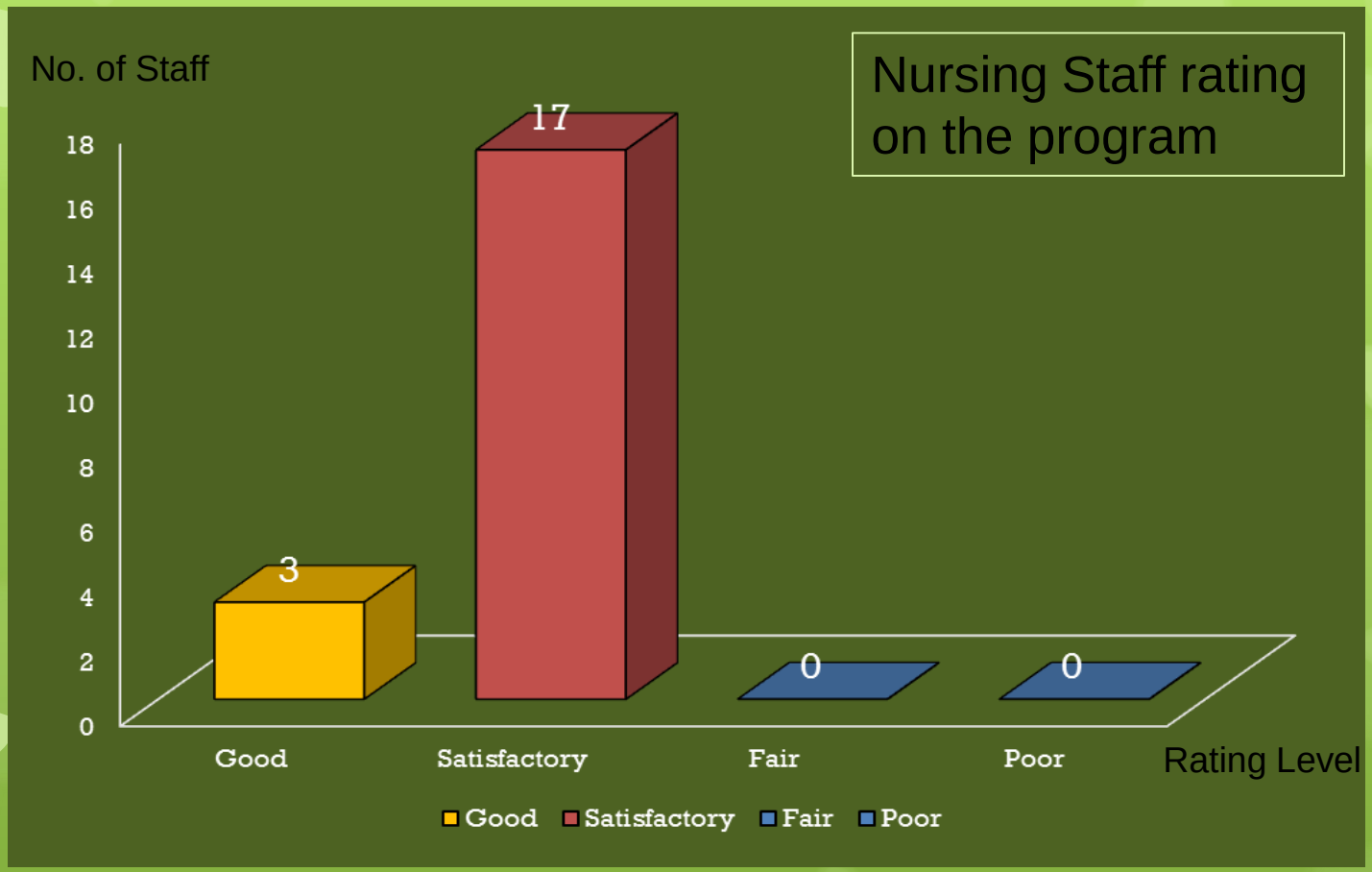
Compare the DVT Incidence Before and After the Study



Patient Satisfactory Level



The Attitude of Nursing Staff



- All nurses agreed that SCD is easy to apply

Financial Implication

- Total patients in phase 2 : 91
- The price of one pair SCD sleeves: $190
- During 1/4/2012 – 31/1/2013
- The price of the SCD machine: $18,000

- Average cost / month
- 91 X $190 / 10 = $1,729/ month

Clinical Implications

For the nursing staff:

Increase autonomy, job satisfaction and awareness on DVT prevention for TKR patient

For the patients:

Benefit from reduced the risk of DVT postoperatively

For the department:

Save the expenses for managing the postoperative DVT

Conclusion

In view of patients' acceptance, financial and clinical consideration, **pharmacological prophylaxis** together with **mechanical prophylaxis** were recommended, and that could significantly reduce the DVT incident for such group of patients.

Limitations and Recommendations

- Resources limitation

  → no routine doppler
- Silent DVT could not be detected
- Only focused on detecting DVT in the early post-operative period. The incidents of late onset may have been missed

Now …

on-going routine nursing practice!

Reference

- Birchfield PC (2001). Osteoarthritis Overview. *Geriatric Nursing*. 22, 124-130.
- Cawley Y (2008). Mechanical Thromboprophylaxis in the Perioperative Setting. *Medical and Surgical Nursing*. 17(3), 177-182.
- Chin PL, Amin MS, Yang KY, Yeo SJ & Lo NN (2009). Thromboembolic prophylaxis for total knee arthroplasty in Asian patients: a randomised controlled trial. *Journal of Orthopaedic Surgery*. 17(1), 1-5.
- Heit JA, Silverstein MD, Mohr DN, Petterson TM, Michael W & Melton LJ (2000). Risk Factors for Deep Vein Thrombosis and Pulmonary Embolism: A Population-Based Case-Control Study. *Archives of Internal Medicine*. 160(6), 809-815.
- Ko PS, Chan WF, Siu TH, Khoo J, Wu WC & Lam JJ (2003). Deep venous thrombosis after total hip or knee arthroplasty in a "low-risk" Chinese population. *Journal of Arthroplasty*. 18(2), 174-179.
- Okuda K, Kitajima T, Egawa H, Hamaquchi S, Yamaquchi S, Yamazaki H & Ido K (2002). A combination of heparin and an intermittent pneumatic compression device may be more effective to prevent deep-vein thrombosis in the lower extremities after laparoscopic cholechstectomy. *Surgical Endoscopy*. 16(5), 781-784.
- Siu CM (2012). Guidelines on Prevention of Deep Vein Thrombosis using Intermittent Pneumatic Compression Device. *O&T-C-CS-009-V2 TMH*.
- Westrich GH, Haas SB, Mosca P, Peterson M (2000). Meta-analysis of thromboembolic prophylaxis after total knee arthroplasty. *Journal of Bone and Joint Surgery*. 82, 795-800.

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